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ABSTRACT

The purpose of this document is to facilitate the incorporation of manpower demand information into the process of educational, manpower, and vocational education planning. The concepts of demand and the importance of using such data along with other data in human resources planning is discussed. This is followed by a detailed discussion of types of demand data, beginning with the occupational forecast. The Colorado cooperative agreement between the vocational education and employment service staffs is discussed in some detail because of its assumed impact on the quality and utilization of forecast data as well as the quality of vocational education planning and administration. Substantial space is given to discussion of the value and use of student followup information. Other State employment service demand data and problems in converting occupational to educational taxonomies are also discussed. Sixty pages of appendixes include the Colorado agreement, sample occupational employment survey questionnaires, the 1970 census list of occupations, a paper on the Data Problem Versus Other Problems in State and Local Manpower Planning, employment statistics for Colorado, 1970-1975, and for metropolitan areas for 1971-1972, and a 33-item bibliography. (Author/SA)

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MANPOWER DEMAND:

INFORMATION GUIDELINES FOR

EDUCATIONAL, VOCATIONAL EDUCATION,

AND MANPOWER PLANNING

A Report for the Management Information
System for Vocational Education

by

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FOREWORD

Resource allocation decisions required of state directors of vocational education continue to be difficult and challenging as they attempt to meet the needs of both individuals and society. This is in part due to the need for improved evaluative information. To assist in meeting this need, The Center for Vocational and Technical Education is in the process of developing a Management Information System for Vocational Education (MISVE). MISVE brings together for analyses a quantity of specific data needed to support management decisions through the identification of needs, opportunities, and problems. Broadly speaking, the information includes analyses of the labor market, demography, program costs, and impact on students.

This report is concerned with the obtaining and use of manpower data as it relates to projected needs for manpower in occupations to which vocational and technical education is addressed.

In addition to the author, Robert C. Young, research and development specialist at The Center, we are indebted to staff members of the Colorado State Board of Community Colleges and Occupational Education, and of the Colorado Division of Employment for their contributions to this report.

Special recognition is also due to Malcolm S. Cohen, associate director, Research Division, Institute of Labor and Industrial Relations, and director, Labor Market Information Systems Project, University of Michigan; and to William Fischer, deputy regional director, Bureau of Labor Statistics, Chicago Regional Office, U.S. Department of Labor, for their helpful suggestions for improving this report.

Robert E. Taylor
Director
The Center for Vocational and
Technical Education

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MANPOWER DEMAND:
INFORMATION GUIDELINES FOR
EDUCATIONAL, VOCATIONAL EDUCATION,
AND MANPOWER PLANNING

INTRODUCTION

PURPOSE

The purpose of this document is to facilitate the incorporation of manpower demand information into the process of educational, manpower, and vocational education planning. To provide a common starting point for the reader and author, the concept of demand and the importance of using such data, along with other data (e.g., cost), in human resources planning is discussed. Having established the importance of demand data for planning a detailed discussion of types of demand data ensues. The most commonly used type of demand data, the occupational forecast, is discussed first, including state and federal data sources, variations in the generation of such data, and the costs and benefits of alternative data collection techniques. The Colorado cooperative agreement between the vocational education and employment service staffs is discussed in some detail because of its assumed impact on the quality and utilization of forecast data as well as the quality of vocational education planning and administration. Because they are not generally recognized by non-economists as manpower data, and because of their importance for accountability purposes, substantial space is given to discussion of the value and use of student follow-up information. Other state employment service demand data and problems in converting occupational to educational taxonomies also are discussed.

MANPOWER DEMAND AND HUMAN RESOURCES PLANNING

National commitments to high levels of economic activity now strain the human resources development system. The problems of simultaneous shortages and surpluses, as in health specialties and elementary education, respectively, are compounded by problems of geographic and socioeconomic inequities in the distribution of human development services. The multi-institutional nature of training, ranging from universal elementary education to apprenticeships, the military, and highly selective private professional institutions, the numerous routes for training even for the same occupation, and the complicated patterns of occupational mobility strain the analytic powers of the best minds and models for human resources planning. These system complexities, in turn, require new information sources for monitoring and forecasting the manpower structure.¹

¹Warren L. Balinsky and Arnold Reisman ("A Taxonomy of Manpower Educational Planning Models," *Socio-Economic Planning Sciences*, Vol. 7, No. 1, 1973) have developed a taxonomy that encompasses conceptual differences in education-manpower planning models. E. A. J. Johnson has underscored the fact that concern for education and human resources is not a new phenomenon but goes back hundreds of years. ("The Place of Learning, Science, Vocational Training and 'Art' in Pre-Smithian Economic Thought," in UNESCO, *Readings in the Economics of Education*, Paris; UNESCO; 1968.) The Organization for Economic Cooperation and Development has produced numerous educational and manpower planning documents (e.g., *Efficiency in Resource Utilization in Education*; Paris, OECD; 1969). The 1972 *Manpower Report of the President* (Washington: USGPO, 1972) documents the development of new labor market information systems and reflects the need for better coordination of manpower programs.

THE DEMAND CONCEPT

When the conventional labor market analyst thinks about the demand for labor, he generally thinks about at least two important parameters of the level of demand: the number of employees demanded and the wages consistent with that level of demand.² Both of these indices are important considerations in vocational education planning, and suggestions regarding such data sources will be included below.

To use simply the estimate of the numbers currently employed or forecast, would be to ignore critical dimensions of the demand analysis. For example, wages reflect the willingness of employers to pay for such employees, or the level of incentive provided to induce labor into that occupation. Another reason for concern with wages is that a large number of vacancies in a particular occupation may be due to the level of wages being inadequate to draw into, or retain in, the occupation a sufficient supply to meet the demand at that level of wages. Wages, in other words, may be too low to equate the level of supply with the level of demand.

The implications of low wages for vocational or manpower planning, then, are twofold: first, low wages may mean that training for that occupation is not warranted because the economic benefits to the trainee after entering the job would be unsatisfactory, perhaps barely above poverty lines; and second, when training may be provided equally efficiently on the job rather than establishing more training programs to fill the job vacancies, an increase in wages might induce the additional supply that would meet the demand. In other words, the wage dimension of demand is important for assessing the quality of the job for which training is being provided as well as for determining whether an increase in wages might be a more effective stimulus to supply than an increase in subsidized training.³

USE OF DEMAND INFORMATION

Educational and manpower planning should use information other than simply data on levels of compensation and employment trends. The development of alternative educational planning

²"Conventional" theory is referred to here because that is the theory according to which education becomes significant because of its impact upon the productivity of labor, which is in turn responsible for the higher wages paid to that labor with higher productivity. The conventional "wage competition" theory may be compared to the more recent "job competition" theory, in which education acts not through productivity but through its value as a credential reflecting the applicant's general aptitude. Lester C. Thurow argues, according to the "job competition" theory, "because most skills are acquired on the job, it is the demand for job skills which creates the supply of job skills." ("Education and Economic Equality," *The Public Interest*, Summer 1972.)

³Clearly there is a great need for more research into relations between low wage jobs, their incumbents, aptitudes needed and those of vocational education students, the changing characteristics of the jobs and students, and the role of refresher training.

models⁴ reflects the need for the incorporation of additional information in the planning process. Among the additional concepts that might be added to those of employment trends and income are those of cost, student interest, alternative sources of supply, student aptitudes, patterns of geographic and occupational mobility, barriers to entry into occupations, and geographic differentials in unemployment and affluence.

In the past, some authors and students of educational planning have gone so far as to argue that not only should other information supplement occupational forecasts, but that unless their accuracy is significantly improved and supplementary information available that will prevent overreaction to such forecasts, the consequences of using such forecasts may be so perverse as to worsen the quality of educational planning.⁵ This argument is based on the assumption not that planners and administrators are currently planning without information but rather that they accumulate substantial insight over their years of responsibility, and that if these planners were forced to use forecasts, their naivete regarding the methodological shortcomings of the projections could still result in unrealistic planning.

It is precisely the inadequacies in the manpower data systems that led to the recent development of new manpower information technologies.⁶ These new labor market data systems and their variations, then, are the principal reason for the present volume: to describe them and discuss their implications for vocational education and manpower. This volume assumes that the use of new and improved information, and experience in its generation and utilization will, as has been generally true for the rest of civilization, result in improved management, planning, and efficiency.

⁴See, for example, G. Z. F. Bereday and J. A. Lauwerys, eds., *Educational Planning: The World Year Book of Education 1967*, New York: Harcourt, Brace, and World, 1967, for a discussion of three alternative educational planning models. R. C. Young, and others, have suggested an eclectic model utilizing concepts from each of these "manpower," "benefit-cost," and "social demand" models for vocational education planning that could be modified for comprehensive educational planning (*Vocational Education Planning: Manpower, Priorities, and Dollars*, Columbus: The Ohio State University, CVTE, 1972).

⁵W. L. Hansen, "Labor Force and Occupational Projections," *Proceedings of the Eighteenth Annual Winter Meeting*, Madison, Wisconsin: Industrial Relations Research Association, 1966, p. 11; and G. B. March, ed., *Occupational Data Requirements for Education Planning*, Madison: University of Wisconsin, Center for Studies in Vocational and Technical Education, 1966, p. ii.

⁶A former director of the Bureau of the Budget has commented on the quality of data available for manpower planning: "... while our existing data systems (national income accounts, flow-of-funds, etc.) have performed well for macro policy decisions, they are highly imperfect or completely useless as a measure of performance and as a means of setting goals in the micro areas of social programs (manpower training, education, health care, and so on)." (Charles L. Schulze, "A Data System for Measuring and Analyzing Public Programs," *Monthly Labor Review*, March 1970.)

The labor market information system research at the University of Michigan contended that the detailed information needed by vocational education planners is one of the most glaring of the manpower information needs. (M. S. Cohen, *Progress Report on the Feasibility of a Labor Market Information System*, submitted to the U. S. Department of Labor, Manpower Administration, by the University of Michigan, October 1971, multilith, pp. 16-17.)

EMPLOYMENT ESTIMATION

INTRODUCTION

The U.S. Department of Labor, with its respective state employment security agencies, has developed and is improving a methodology for providing states with forecasts of their occupational employment.⁷ These forecasts are based on industrial employment data required for reporting the numbers in each establishment covered by unemployment insurance. This employment by industry data are analyzed for the trend over time and the historic trend is then projected into the future. In this industrial forecast, as in all of the analysis techniques discussed below, the Department of Labor does recognize that occasionally there may be reasons to believe that the future may be somewhat at variance from past trends. In these cases, adjustments are made to compensate for the insight derived from the additional (non-trend) information.

Given the information on industrial employment trends, an analysis is undertaken of the occupational composition of each industry's employment and the technological changes likely to affect that occupational structure. Using census information, plus inputs from other sources such as professional or trade organizations, an occupational structure for each industry is forecast. Applying each forecast occupational structure to its respective industry, an estimate is made of the future level of occupational employment for each industry. Given this information on the level of occupational employment in each industry, employment in each occupation, say, welders, is summed across all industries so that total employment in that occupation is estimated. Having done this for each occupation, one arrives at a picture of total employment in each occupation (having added across all industries).

The above process, however, yields only total employment by occupation at a future specified date. It is not an analysis of the educational training requirements or even of net openings likely to occur in the occupation. The educational requirements for occupations will be discussed below. The approach by the U.S. Department of Labor (hereafter USDL) and its respective state employment agencies to assess occupational openings for related training is to use the concepts of growth plus attrition. Growth is simply the expansion of employment in an occupation over time. Attrition

⁷Industrial employment forecasts (forecasts of the number employed producing a particular product, including all employees working on that product, regardless of skill) have been available for some time. Only recently have occupational employment forecasts (forecasts of the numbers employed in particular skill categories, regardless of product produced: welders, regardless of whether they are employed in manufacturing or construction) based on work site and response of the worker become available. Census data, that assumes the wife knows exactly what her husband does (do wives know whether their husbands are machinists or tool and die makers?) and are based on place of residence, has been available for some time. The census also has fallen short in that it has only been available in limited detail for state and substate regions and it is available only once every ten years.

is the sum of those who die or retire from that portion of the labor force in that occupation. The sum of these two concepts then is the "annual openings" concept found in the typical USDL publication on employment trends.⁸

This "BLS matrix" approach to manpower requirements forecasting is not without its weaknesses. One of the problems in such forecasting is that of accurately forecasting the level of economic activity, both in the aggregate and by sector. The willingness of the legislative and executive branches to maintain full employment in the face of inflation, say, uncertain shifts from a war economy to a peacetime economy, or vice versa, differential sectoral impacts of such changes, and fluctuating national priorities for industrial subsidy (e.g., the environment), typify some of the problems in industrial trend assessment. A second problem encountered in the occupation/industry matrix approach to forecasting is that of appraising the rate of technological change in the economy as a whole as derived from sectoral estimates of such change. This technological change is an important component of a third problem: estimating productivity trends, or the labor input coefficients for given levels of sectoral output. In addition to anticipating the rate of technological change for industrial sectors, one must—to determine these labor coefficients—also anticipate the effect that the supply of labor will have on the quantity of labor actually utilized, an effect sometimes referred to as the "substitution effect," the substitution of labor for capital inputs as a function of the relative availability and productivity of each. Other substitution effects, of one kind of labor for another (e.g., paramedical personnel for physicians), are also weak links in the BLS matrix approach. A fourth problem in forecasting manpower requirements is that of estimating the educational requirements for given occupations. This problem, which is, unfortunately, not peculiar to the matrix approach, is one of the most serious and concerns the relationship between the kinds of education that are actually required for adequate performance in given occupations. One cannot assume, for example, that simply because the average employee in a given occupational cluster has a bachelor's degree that that is the optimum level of education for any job in that cluster: it may be either too much or too little education, depending on the general nature of the job itself, kinds of individuals attracted into that occupation, the content of different baccalaureates, the availability of associate and master's degree programs, and the homogeneity of jobs which constitute that occupational group.

A final difficulty with the matrix approach is that it does not account for interoccupational mobility. Not only do openings occur in an occupation as a result of growth, death, and retirement, but a number of the incumbents also will leave an occupation because they were promoted or changed occupations. Partially offsetting this conservative bias in the BLS calculation of annual openings is a liberal bias, a tendency to overestimate net openings: a number of the occupational openings will be filled not with graduates from formal pre-employment training programs but by those who have come from the general education track, on-the-job training, or mobility from other jobs. The net effect of these counteracting biases is unknown and will, of course, depend upon the occupation. Because of the uncertainty surrounding the net effect, it is very useful for the manpower planner to look not only at the employment service's forecast of annual openings anticipated but also at other indices of

⁸See, for example, USDL, Bureau of Labor Statistics, *Occupational Manpower and Training Needs*, Bulletin 1701, Washington: U.S. Government Printing Office, 1971.

the likely success of graduates. Information on the proportion of graduates who sought training related employment and were able to acquire such employment would be highly useful in assessing whether the market was glutted with graduates. If only a small portion of those who sought related placement were able to find jobs in that occupation, this would tend to indicate the market was glutted and suggest that perhaps the output of such trainees should not be expanded, unless a substantial change in the labor market was anticipated. Similarly, if the wages received by graduates were very low, there would seem to be substantial room for questioning the use of forecast net annual openings as an adequate rationale for program expansion.

TOMORROW'S MANPOWER NEEDS

More than forty states have completed or currently are preparing occupational projections using the methodology described in the BLS publication *Tomorrow's Manpower Needs*.⁹ This technique provides ten year forecasts of occupational employment and annual openings, sometimes classified by U.S. Office of Education curricular code,¹⁰ the ten year horizon being necessary for planning, constructing, and staffing programs in addition to the assurance of openings for a time after the graduates leave the program.

Briefly, the steps followed to generate the *Tomorrow's Manpower Needs* forecasts are as follows:

1. Projection of the population by age, sex, color, and geographical distribution.
2. Projection of the labor force, by age, sex, color, educational level, and state.
3. Based on the assumption of minimal unemployment, an estimate is made concerning future levels of gross national product, based on trends in productivity, hours of work, and consumer expenditures.
4. These estimates of final demand are examined for their implications in terms of industrial output at both the final stage of production as well as among the intermediate and basic industries that provide the inputs to the final production process.
5. Given the final output expected from the various industrial sectors, estimates are made of the manpower or occupational structure within each industry required to produce that output.
6. These estimates of occupational employment by industry, based on the industry/occupational matrix, or the BLS matrix, may be summed to provide the total estimated employment by occupation.

⁹U.S. Department of Labor, Bureau of Labor Statistics, *Tomorrow's Manpower Needs*, volumes I-IV, Washington, D.C.: USGPO, 1969; and the revised version of volume IV, 1971. For an example of data from a state report using this methodology, see Appendix F.

¹⁰See, for example, USDL, BLS, *Occupational Manpower and Training Needs*.

7. In addition to changes in requirements as a result of growth or decline in occupational employment, estimates are made of those leaving the work force through withdrawal, death, and retirement. These two components of future occupational need—growth and occupational losses—are summed to provide the estimate of new openings for labor force entrants. Net interoccupational mobility is allowed for only roughly, due to the inadequacies of empirical data.

This methodology, which originally was used to generate national projections, utilizes the national industry-occupation matrix to translate state projections of industrial employment into occupational employment estimates for state and local areas. The staffing patterns (of occupational employment in particular industries) in the matrix area and the national averages do vary from one region to another. Testing for the amount of error involved as a result of using the national matrix to predict changes in state occupational employment, the BLS tentatively has concluded that the use of the national matrix "made reliable projections in a vast majority of the cases." The use of the national matrix, however, in cases where state matrices were not available, appears to be less accurate when the state is unusually small or experiences unusual growth.¹¹

The Tomorrow's Manpower Needs (TMN) output consists of forecasts for 162 occupations for states as a whole, with no substate breakdowns. In addition to employment projections for ten years in advance, the TMN approach also calculates the net change in occupational employment, expansion needs (openings due to growth in occupational employment), replacement needs (openings due to withdrawal from the labor force), and the "total demand for workers." The latter, as discussed above, is simply the sum of growth plus replacement needs, and thus does not, as discussed earlier, provide an accurate assessment of the number that should be trained in the public training sector. Openings due to promotion and occupational mobility must be considered, and the calculation of net training to be provided by any particular training institution must include estimates of the output from other training sectors such as the military, apprenticeships, on-the-job programs, etc.

IMPROVED CENSUS DATA

Assuming that the development of state or area matrices will add significantly to the reliability and accuracy of subnational occupational projections, the BLS, Manpower Administration, and their allied state agencies have agreed to undertake the development of an integrated national/state industry by occupation employment matrix. Initially, this matrix system will use as its data base the computer tapes of occupation by industry from the 1970 census. State SMSA (those over 250,000) and national employment data will be tabulated by sex for approximately 440 occupations and 227 industries. (See Appendix D for the list of occupations.) Eventually the number of matrix occupations involved will be substantially expanded, as described below in the section on the Occupational Employment Statistics Program.

¹¹U.S. Department of Labor, Bureau of Labor Statistics, *Tomorrow's Manpower Needs: Research Report on Projection Methods*, Bulletin 1769, Washington, D.C.: U.S. Government Printing Office, 1973.

The Manpower Administration will have the primary responsibility for providing guidance and assistance to the states in the use and application of the resultant projections for designing manpower programs, and the BLS, on the other hand, will have primary responsibility for the system's technical development and statistical design.

The schedule for the delivery of the state matrices is for the states to receive their preliminary state matrices from BLS by early 1973. By the middle of 1973 the state matrix will have been developed and checked for consistency against the national matrix, any needed adjustments having been made by that time. Regional conferences to deliver and explain the computerized manipulation of the state matrices will be held during the latter part of 1973. During the first half of 1974, technical advice will be given to the states for the development and projection of substate matrices.

OCCUPATIONAL EMPLOYMENT STATISTICS PROGRAM

Although the original *Tomorrow's Manpower Needs* matrix was based upon 1960 census data, eventually it is planned to build a matrix with far more occupational detail than even that used in the 1970 census. For this purpose, in 1972 the Bureau of Labor Statistics began the implementation of its occupational employment statistics program. During 1972 thirty-three manufacturing industries were surveyed with as many instruments, one for each industry. (See Appendix C for one industry's schedule.) More than 1,400 occupations were listed on the schedules with more than 2,000 expected to be in the OES taxonomy when the survey of non-manufacturing is complete. This would be a fourfold expansion of occupational specificity.¹²

During the initial developmental stages twenty states¹³ will be cooperating with the BLS and MA, and it is hoped that eventually all states will participate. As indicated above, manufacturing was surveyed during the first year, 1972. During 1973 all non-manufacturing industries are to be surveyed, with the exceptions of government and wholesale and retail trade. The latter cluster will be picked up in a third cycle, probably in 1974. The survey then will be conducted on a regular two or three year cycle in subsequent years, with each year covering different sets of industries. Agriculture and certain regulated industries (e.g., railroads) will be excluded from the survey's coverage.

The sample design in the 1972 survey of manufacturing was such as to enable national occupational estimates, although in those states that are "cooperating" to generate estimates for the state and its principal SMSA, the national sample will be supplemented to include sufficient establishments

¹²The reason for one instrument for each specialized industry was that each industry has a unique occupational structure and to put all occupations on the same instrument and send that instrument to all firms would have been to provide a powerful incentive for non-response. Rather than having 1,400 occupations on one manufacturing schedule, few of the thirty-three schedules had more than 200 occupations listed, and even that number is a bit awkward for small firms.

¹³Alaska, Colorado, District of Columbia, Florida, Indiana, Maine, Maryland, Massachusetts, Minnesota, Missouri, New Jersey, Nevada, North Carolina, Oklahoma, Oregon, South Carolina, Utah, Virginia, West Virginia, and Wisconsin.

to enable those sub-national estimates. The manufacturing survey was implemented with generally structured questionnaires, although space was provided for the establishments to identify significant portions of their employment that fell into the "all other" categories, or those in categories that might require substantial periods of education or training.

Beginning with the 1973 survey of non-manufacturing, the national sample will be abandoned, with national estimates being planned on the basis of data from the twenty cooperating states' surveys plus other data sources such as the census. Because of the large number of firms involved, schedules generally are being implemented through the mail, although there has been some experimentation with personal contacts and the use of the telephone with regard to their impact upon response rates and survey efficiency.

The coverage of the survey after the third cycle will include all non-agricultural wage and salary employees. Consequently, salaried officers of corporations will be included, as will governmental civilian employees, but the survey will exclude proprietors, the self-employed, unpaid volunteers, family workers, farm workers, and domestic workers in households. Because of these exclusions from the OES data base, or estimating problems due to the small size of an industry in a particular state, the development of state matrices with the OES occupational detail will require the use of other data sources, such as the occupation-industry in size, content, and technology, or the 1970 national census occupational ratios for the problem industry.

The final timetable for the complete installation of the OES program and its incorporation into the occupation-industry matrix program is still somewhat up in the air. With the non-manufacturing portion to be implemented during mid-1973, it would appear likely that the governmental and trade (retail and wholesale) segment would not be implemented until sometime during 1974. Assuming some time for the processing of the data and substantial work being done on the preparation of the matrix system to enable its utilization of OES inputs, the earliest likely dates for the availability of forecasts utilizing OES occupational detail would seem to be late 1974 or 1975. State and substate data might be expected even later than national data, given the typical time lags in technology implementation at the state as opposed to the national levels, although this will not be true for all states.

VARIATIONS ON THE OES THEME

Development of the OES system has seen several experiments conducted by state employment security agencies around the general OES theme. The experimental projects were as follows:

1. Development of a condensed occupational classification system suitable for use in collecting occupational employment data (Wisconsin).
2. Evaluation of mail vs. personal visit collection of occupational employment data (Indiana, Oregon).
3. Evaluation of structured vs. unstructured questionnaires in the collection of occupational employment data (Massachusetts, Missouri, Virginia).

4. Determining optimum size samples needed to produce valid occupational employment estimates (South Carolina, Utah, West Virginia).
5. Evaluating the collection of occupational data on unfilled jobs as well as filled jobs (Florida, South Carolina).
6. A comprehensive survey of all manufacturing firms, collecting from the employer his estimate of expected employment by occupation one and two years hence, deviating from the typical USDL confidentiality requirements by telling employer respondents the "information will be made available to vocational education and other agencies for manpower planning, career guidance, and other curriculum change purposes" (Kentucky: Bureau of Vocational Education and Kentucky Manpower Planning Council).
7. A supplement to the number of establishments necessary to estimate state and SMSA occupational employment, the supplement being large enough to enable estimates of occupational patterns by industry for principal SMSAs and substate educational planning regions, much of the additional work load being absorbed by the personnel of the state division of vocational education, who will interview non-respondents to the mailed schedules plus all firms employing more than 100 employees (Colorado).

As the other experiments' reports are or will be available elsewhere, this report will concentrate on a description of the experiment in Colorado, where vocational educators were used to supplement the data gathering resources of the state employment security office.

COLORADO'S SYSTEM

Concept and Rationale

The Center for Vocational and Technical Education and Colorado's State Board of Community Colleges and Occupational Education and Division of Employment recognized that the federal Occupational Employment Statistics program represents an effort to substantially improve the quality of occupational information available for planning education and manpower programs. Recognizing the importance of improved occupational specificity in the manpower data available for planning, the State Board of Community Colleges and Occupational Education (SBCCOE) decided that such information was so important that they wanted to have such projections available not only for the state as whole and the Denver SMSA but also for the Pueblo and Colorado Springs metropolitan areas and four substate educational planning regions.

The rationale for the SBCCOE relying on the OES framework for manpower data is as follows:

1. OES is expected to eventually become a nationwide source of detailed current occupational employment information.

2. OES data will gradually be incorporated into the BLS occupation by industry matrix forecasting project, perhaps the most elaborate manpower forecasting program in the world.
3. Using the OES taxonomy will enable the state to compare its manpower structure and needs with those of other participating states.
4. When the OES-matrix system is fully implemented, forecasts will be available for 2,000 occupations, as opposed to 440 occupations under the BLS-census system, and 160 under the current Tomorrow's Manpower Needs matrix.
5. This cooperative arrangement between federal and state labor agencies and the state vocational education division is expected to be far more efficient and reliable than the vocational education agency trying to set up its own manpower research unit.
6. Although having substantial prima facie logic, estimating openings for graduates by asking employers about the number of new hires they anticipate during the forecast year and using that data for planning purposes would inflate estimates of annual openings.¹⁴
7. Similarly, although its intuitive reasonableness is also granted, asking employers to forecast their employment for periods useful for planning purposes is believed less accurate for five year planning purposes than the proposed methodology.¹⁵

¹⁴The BLS methodology separates labor turnover from the estimation of net openings appropriate for training. To ignore the fact of labor turnover is to ignore the fact that some of the new hires coming to a firm will simply be leaving similar jobs at other firms, so that although there will be six new secretarial hires among a set of firms within the period of a year, if five of the jobs are filled by secretaries simply changing employers, only the sixth job would represent a net demand for an additional secretary. Thus to use "new hires" as an estimate of the demand for a net addition of skilled personnel to an occupational category may well result in a substantial surplus of such personnel.

¹⁵Among the weaknesses in the use of employer forecasts of their future employment levels are the following: (1) Employers generally are not concerned with forecasting their own employment by occupation and do not assign staff to the problem. (2) The man who is probably most knowledgeable about the current staffing of the firm, the personnel officer, is probably not the one most knowledgeable about the expansion plans of the firm, the latter most likely being the comptroller, vice president for development, or the president. A dilemma exists in that although the latter may know the expansion plans for the firm, he may not know the detailed manpower implications of such plans. (3) The sum of current employer responses about growth or new hires clearly does not represent the responses from a random sample of all the firms likely to be in existence during the forecast year: births and deaths among the establishments are unlikely to leave the number of firms or their overall manpower structure unchanged. In addition to the evidence cited elsewhere (Young, Clive, and Miles, chapter II), the USDL has contracted with Macro Systems, Inc. to examine the relative effectiveness of the extensive use of vocational education and other training personnel to survey employers and asking the employers to forecast as opposed to the more standard BLS approach and its variants, such as the Colorado experiment discussed in this report.

8. The availability of vocational education interview personnel might facilitate a first visit to all sample firms to align their job structures. This would add substantially to user confidence in the data. This problem, of inconsistent job titles, means that without title alignment, even a 100 percent mail response rate might yield poor data.¹⁶
9. A comprehensive employer survey, as opposed to a scientific sample, is rejected due to the relatively high marginal cost of and minimal expected benefits from covering employers that would not be included in the sample.
10. OES categories have been coded to the *Dictionary of Occupational Titles* so that conversions may be made to USOE codes. Eventually OES categories will be coded directly to the USOE codes.

In addition to its concern for better manpower data, the SBCCOE was also interested in selected members of its staff becoming more familiar with manpower information and the structure of labor markets in their communities. With these joint concerns in mind, The Center and the SBCCOE proposed to the Division of Employment (DE) that SBCCOE staff be used to collect OES information outside the Denver area, to enable enhanced geographic and occupational specificity outside the principal SMSA. If the SBCCOE had simply been interested in data more detailed in geographic and occupational terms, it simply could have provided financial resources to the DE sufficient to enable the required sample increase.

The SBCCOE personnel assigned to provide the up to thirty-six man months of survey time were classified as "job development specialists." In addition to their role as surveyors, they are typically assigned tasks such as providing manpower information to guidance personnel, assessing training priorities, and identifying cooperative work experience slots. More specifically, the rationale for assigning such personnel to the collection of OES data assumed the following benefits:

1. Improved attitudes by employers toward the data system, the involvement of educators underscoring its intended utilization.¹⁷
2. A higher response rate than would be realized through a mail-out survey.¹⁸

¹⁶This use of vocational education staff is not yet implemented in Colorado.

¹⁷This also may be partially achieved by the collection and publication of endorsements of the survey by important concerned parties such as labor, employer, educational, and manpower agencies. See Appendix B.

¹⁸It would be difficult to significantly improve upon Oregon's 93 percent response rate. In Oregon's analysis of personal interview versus mail-out data collection, the response rates and data quality for both data collection methods were similar. The high mail-out response rate may have been affected by the endorsements referred to above and reflected in Appendix B. (Wesley E. Zellner, "Oregon's OES Survey Experience," in *Selected Papers from North American Conference on Labor Statistics*, June 26-29, 1972, Denver, Colorado; Washington, D.C.: U.S. Government Printing Office, 1972.)

3. An enhanced likelihood of the utilization of the data by the education community.
4. Better student counseling and placement on jobs because of an improved awareness by the education community of where the jobs were and the nature of the jobs.
5. Improved school curricula as a result of more frequent contacts between the schools and industry.

In addition to the foregoing benefits, consideration is being given to the implementation of a supplementary vocational education questionnaire at the time of the OES survey. This supplementary questionnaire, to be implemented by the job development specialists after completion of their OES interviews, might deal with questions such as the employer's appraisals of critical manpower needs, the establishment's interest in task analyses for curricular change, hiring requirements for particular occupations, existence of on-the-job training programs, and the interest of the employer in discussing potential cooperative work experience slots for their firm. These data, as currently envisioned, would be for the exclusive use of the vocational education division, however, it would be very useful if such data on the existence of potential training slots in the firms were also made available to other training agencies such as the National Alliance of Businessmen and the various Manpower Administration on-the-job training programs.

Experience and Lessons from Colorado

Unusual difficulties and growing pains were expected during the Colorado manufacturing survey. The state was not included among those initially planned for the manufacturing survey. The DE, SBCCOE, Manpower Administration (MA) and BLS (both of the USDL), and the Office of Management and Budget all believed, however, in the benefits to be derived from the proposed institutional cooperation, and with the blessings of these agencies an attempt was begun to implement a catch-up manufacturing survey. The process of obtaining the approval of these agencies, including definition of the proposal and working agreement and the final approval by OMB, took somewhat longer than anticipated (four months) and caused a substantial overlapping of the manufacturing catch-up with the non-manufacturing preparations. This resource strain, plus the relatively common data processing problems found in state employment security offices, complicated the gearing up process. BLS national and regional offices did, however, supply consultants to the training sessions, their inputs adding useful experience to the preparation of the interviewers.

Among the difficulties experienced during implementation of the manufacturing catch-up, and which are being taken into consideration during the non-manufacturing preparations, are those of inadequate publicity for the survey and inadequate solicitation of endorsements by concerned and influential organizations. The fact that responses from 5,500 units will be sought during the non-manufacturing survey, as opposed to 1,400 for the manufacturing, and that none of these will be collected by the national BLS office, emphasizes the importance of publicity and endorsements to

yield high response rates to the mail-out schedules.¹⁹ If the units contacted do not recognize the importance of the survey and fail to respond at a relatively high rate to the mail-out cycle, this would leave an overwhelming interviewing load for the job development specialists and seriously jeopardize the objectives and success of the survey.

The data processing and record keeping problems of the Division of Employment, which are not atypical for such agencies, were reflected in the difficulties in obtaining labels for instruments and survey lists for interviewers, sorting of the schedules by geographic area, and an increased awareness of the need for updating of the employment security files prior to the non-manufacturing cycle. Outdated addresses, existence of new firms, mobility or termination of old firms, and the misclassification (wrong industry designation) of firms all complicated the lives of the interviewers. The ability of the Division of Occupational Education to provide data processing will be a major contributor to the final success of the manufacturing survey.

Lessons On Surveyor Training

Lessons learned about surveyor training from the manufacturing survey include that (1) not only should verbal instructions be given to the interviewers, but also a set of written guidelines should be presented to them during training, and (2) the evaluation questionnaire to be filled in by the interviewers should be thoroughly discussed during training. The importance of written instructions is that they facilitate a review of instructions, they facilitate training of those job development specialists unable to attend the principal training session, and they provide structure for the training session itself. The importance of presenting the survey process evaluation questionnaire to the surveyors during training is that unless the surveyors realize that information concerning the amount of time they spend interviewing, travel time, kinds and sizes of firms they interview, problems and successes they have during interviews, etc., will be needed to evaluate alternative survey techniques, they will not record such data, and its retrieval will be nearly impossible after the completion of the survey. If such data are not available, improvement in the efficiency of the survey process will be complicated.

Additional lessons were learned about training. Inexperience of the trainers with the survey instruments was reflected during the manufacturing training sessions, breaking the rhythm of the sessions and weakening the trainees confidence in the quality of the survey and its administrative machinery. Also, concerning the subject matter for the training, the unique nature of the survey and its purpose should be pointed out to the job development specialists. They should have a ready and accurate response to the negativistic employer who responds, "What is this, another of those useless federal surveys?" They should know in substantial detail that this data is not available

¹⁹The non-manufacturing survey (excluding trade and government) will be implemented in three stages: first, a personal contact will be made with all firms (350 of them) with 100 or more employees; second, a comprehensive mail-out of schedules to all sample firms with less than 100 employees, followed up with a second mailing to non-respondents; and finally, personal visits by the job development specialists to those firms from whom no response has yet been elicited.

elsewhere and exactly what the data will be used for. They should know why the employer is not being asked to estimate the number of employees in particular occupations that they intend to hire. They should know, in general, how the data will be used to estimate manpower demand and what other data also will be used to determine manpower priorities. Finally, they should have a firm understanding of who and what organizations endorse the objectives and means of the survey. Unless they are reasonably equipped to answer such questions, their own confidence in the survey will be weakened, as will that of employers curious as to why they are being asked to supply still more data to the federal government. It is anticipated that the experience gained through the manufacturing survey and the fact that preparation for training will not have to be quite so rushed will substantially enhance the flow and quality of activities for the non-manufacturing survey.²⁰

Lessons on Data Collection and Processing

Not unexpectedly, in a new survey additional problems were experienced during data collection and the processing of the questionnaires. Staff shortages and illness, inexperience, and inadequate planning all hampered the control and editing of the incoming questionnaires. The newness of the cooperative agreement between separate agencies bred communication problems regarding the appropriate distribution of responsibilities for the collection of the data and the resolution of day-to-day bugs in the system. Staff in both agencies learned the importance of (1) explicit schedule control activities, (2) automated control and record keeping, and (3) the availability of adequate staff for selecting, stuffing, and sealing mailed and enumerated packets.

The Occupation to Education Taxonomy Conversion

One problem experienced during the processing of the data was that of converting the survey's occupational taxonomy to the educational planner's curricular taxonomy. This has been a persistent problem in the educator's utilization of such survey data, and although its final resolution will probably require a significant joint project from the National Center for Educational Statistics and the BLS, an operational mode was adopted in Colorado for the short-term utilization of the data.

The problem arises out of a lack of a direct conversion from OES categories to USOE categories. BLS has already made a conversion from the OES taxonomy to the classification system in the *Dictionary of Occupational Titles*, and a joint Manpower Administration-USOE project, *Vocational Education and Occupations*, provides a conversion between DOT and USOE taxonomies. In many cases, however, OES categories have more than one DOT category. While some of the different DOTs in the same OES category are often similar enough to require the same USOE code curriculum, others

²⁰The haste in preparation for the manufacturing survey was due partially to the overlap of preparations for manufacturing with preparations for non-manufacturing, partially to inexperience with the survey, and partially to the fact that the delay pushed the start of the survey right up to the start of the school year, causing a triple pinch on the time of the surveyors: gearing up for the survey, interviewing, and start of the school year.

are distinctly different and require separate curricula. For example, in the manufacturing survey, nine DOT categories have been assigned to the OES category of "Plumber and/or Pipefitter." Six of those DOTs correspond to the "Plumbing and Pipefitting" USOE curriculum. Two of the DOTs have received no corresponding USOE code, and one of the DOTs corresponds to the USOE curriculum "Heating." Clearly there are unique characteristics to these two curricula and they cannot simply be merged into one curriculum to correspond with the OES code system. Thus, there is more than one curriculum appropriate for many of the OES categories, and the educational planner is uncertain regarding what portion of the employment in that occupational cluster is appropriate for each specific curriculum.

What has been done in Colorado to deal with this problem was to assign the Division of Employment the responsibility of assigning a DOT category that most appropriately reflects the OES category. The Division of Occupational Education was then assigned the responsibility of determining the USOE code that corresponds best to the DOT. The resulting relationship was simply one USOE code for each OES category, which greatly simplified the analysis of the data. The simplicity, however, means that the manpower implications for some curricula will be exaggerated and for others will be underestimated. For example, if in the above example of the OES category of "Plumber and/or Pipefitter," the Division of Employment selects as representative of that category one of the six DOT codes for which the USOE curriculum of "Plumbing and Pipefitting" is the most appropriate curriculum, this will mean that manpower demand for the graduates from the "Heating" curriculum will be underestimated.

Some insight into the dimensions of the problem can be gained from the use of breakdowns of the Current Population Survey by DOT codes, but the only one available to the present writer is broken down only into three-digit DOTs and is based on 1966 data. Thus, since the OES has more detail in its taxonomy than that of the CPS reclassification into the DOT, it is unlikely that this particular analysis will be a major aid for the manufacturing cycle of the OES. Nor is the application of the DOT taxonomy to CPS data likely to bear much fruit in the future, for the CPS surveys only about 105,000 persons sixteen years of age and over, something like 40 percent of those will not even be in the labor force, and the "n" in many of the cells will become quite small when the sample is broken down into three or more digits of the DOT.

The final resolution of this difficulty of converting from the OES to the USOE and higher education codes, as suggested above, would seem to lie in the designation of a specific federal interagency labor-education task force, much as was done to generate the conversion from DOT to USOE curricular codes. The rationale for such a task force is clear, for if we can afford to spend \$2.2 million on the OES each year,²¹ with educational planning a principal beneficiary of that data, then surely

²¹Davis A. Portner, "The Role of the OES Program in the Development of the Labor Market Information System," in *Selected Papers from North American Conference on Labor Statistics*, June 26-29, 1972, Washington, D.C.: U.S. Government Printing Office, 1972, p. 128.

we can afford to set aside enough resources to convert the data into a form that will be meaningful to the educators and manpower planners.²²

Empirical Occupation-Education Taxonomies

In addition to the use of prescribed taxonomies to determine the relationship between occupations and curricular categories, there is an alternative, empirical methodology that could be employed using follow-up data. This approach would ask, what is the relationship between the jobs that students actually take and the curricula in which they were enrolled. Such empirical relationships could be used to plan the educational system. Some modifications may be necessary, but such an approach would recognize that the relationship between jobs and education is a weak one, that education has many objectives that are not directly aligned with occupational careers, and that in many cases occupational skill training may best be provided on-the-job for reasons of efficiency, technological lag in education, equity (access to jobs for minorities), and difficulties in forecasting the appropriate number of net openings (demand minus supply) in specific occupational and geographic areas that should be filled from specific training programs.²³

This empirical approach to intertaxonomy conversions would assume that only the proportion of graduates actually taking up jobs in a particular occupation would be considered as "supply" for that occupation.²⁴ This approach would be substantially improved if the follow-up system asked

²²In addition to the publication *Vocational Education and Occupations*, Washington, D.C.: U.S. Government Printing Office, 1969, referred to in the text, there are other intertaxonomy conversions available to the researcher or planner. None are, however, available in published form per se, although the BLS report *Occupational Manpower and Training Needs* does provide a set of national occupational titles, forecasts to 1980, and the USOE codes to which those forecasts apply. These 232 occupations are essentially an elaboration upon the 160 occupations found in *Tomorrow's Manpower Needs* referred to above. Educational researchers and planners may, however, obtain working conversions for the DOT and OES taxonomies by writing to the Coordinator, Occupational Survey Operations, BLS, USDL, Washington, D.C., 20212. The conversions between OES, USOE, and "HEGIS," (Higher Education General Information System) codes are not yet published, but it is hoped that the forthcoming *Standard Occupational Classification System*, currently being worked on by the Office of Management and Budget, will resolve some of the current planning problems due to the lack of such conversions. It is hoped that after this standard taxonomy is out that it would provide consistency to the many classifications now used in the BLS and state area wage surveys.

²³One such forecasting problem: estimating the supply likely to come from other training sources such as correspondence schools, the military, the private sector, and the proportions of forecasted employment that will be filled through the occupational and/or geographic mobility of those already in the labor force.

²⁴The theoretical holes in this assumption are readily apparent: conceivably, more jobs and/or higher wages or benefits would result in an increase in the "supply" so defined, from constant levels of output of trainees. The supply to a particular occupation would, of course, be a function of time: students not only moving into and out of various jobs during their careers, but also into and out of the labor force.

the students when they did not take a related job why they did not do so. Did they try to take such a job? Were there no related openings available? Had they even intended to take such a job? Did they find a better job paying higher wages (or with other more attractive benefits)?²⁵ For example, if there were a large number who wanted to take a related job but did not do so because such jobs were "not available," then this might indicate the need for either better placement counseling (if related jobs did actually exist) or a reduction in the enrollment due to a surplus of trainees over available job openings. Definition of intertaxonomy conversions might be done either by a panel of experts or by those actually involved in the hiring and firing of the trainees. The researcher must, of course, plug for the validation testing of the experts' conversion by asking the students and their employers about the relatedness of their jobs and curricula.

On the other hand, while occupational trend information is useful for the planning of untested manpower programs, presumably the education or manpower planner should not idolize such statistics. If a large number of students indicate interest in a curriculum that is not inordinately expensive, and they are experiencing reasonable levels of success in their post-training experiences (in terms of income, job satisfaction, employment, college entrance, etc.), even though a small number of them are employed in related jobs, one might well have severe reservations about eliminating such a program with such successful trainees. The program may be impacting on student success through means more subtle than simply the development of job skills. Among such other consequences might be the development of a spirit of inquiry, improved attitudes toward potential co-workers, a commitment to the work ethic, or generalized job skills through a recognition of the importance of "academic" subjects, that also may provide the student with substantial future mobility.

Benefits from the Survey

The survey of the job development specialists, the interviewers in the Colorado experiment, revealed that offsetting the survey's difficulties was the general appraisal of the survey by both the employers and the interviewers that the survey was worthwhile. Many of those employers who did express hostility may be expected to support the program more enthusiastically when it is explained by a more experienced interviewer who has himself received better training concerning OES's purpose and methodology. Such training will also improve the interviewers' appraisal of the survey.

The reasons for the employers' support of the survey were not plumbed, but the interviewers had several explanations for their own belief in the survey. The most important reason for the interviewers' support of the survey was that it would facilitate their performance in guiding students toward jobs. The next most important response was that it would help them to suggest curricular improvements to the staffs of their institutions. Half of the respondents indicated that the survey

²⁵A national follow-up survey has shown, for example, no significant economic advantage to the student for taking a related job. Gerald G. Somers, *The Effectiveness of Vocational and Technical Programs*, Madison: Center for Studies in Vocational and Technical Education, University of Wisconsin, 1971, p. 205.

would make it easier to line up places for their students to obtain on-the-job experience and training before leaving school. Still other arguments supporting the non-data value of the survey were that it would help in planning field trips, help the job development specialist get acclimated with commercial establishments in his area, and provide good public relations for the school.

OTHER DEMAND DATA

STATE EMPLOYMENT SERVICE DATA

Employment and Unemployment

Data on the levels of employment and unemployment for specific geographic areas are very useful for the purposes of vocational, education, and manpower planning. Such information is a partial reflection of the extent of labor market trauma currently experienced by that population and, when the cause of that unemployment is structural rather than due to inadequate aggregate demand,²⁶ such unemployment information may be used as a guide reflecting an area's need for educational, manpower, and/or counseling services. The geographic distribution of unemployment is a useful consideration in determining the geographic distribution of vocational education or management training resources.

Unemployment data should not always be interpreted as a perfect reflection of labor market stress because the national estimates only consider those who have no job at all. In the current population survey data, those who work one hour per week are considered employed and are not reflected in the unemployment statistics. The state unemployment insurance data on the other hand, do reflect less than full-time employment. In any case, the unemployment rates may be grossly misleading regarding the nature and magnitude of the manpower crisis. For example, when the nation's unemployment rate for males was only 4 percent, according to the televised reassurances of the secretary of labor and the president, fifty-one cities had an inner city average unemployment rate of 9.6 percent and an inner-city "subemployment" index of more than 30 percent.²⁷ These data suggest that consideration might be given to correlations between the geographic distribution of unemployment and subemployment: if there is a poor correlation, then work should be undertaken to develop more precise measures of the geographic distribution of labor market problems.

²⁶Structural unemployment generally may be defined as that unemployment caused by an incongruence between the skills and/or geographic location of the labor force and the location of and skills required for jobs offered by employers. See, for example Lloyd G. Reynolds, *Labor Economics and Labor Relations*, Englewood Cliffs, N.J.: Prentice-Hall, 1970, pp. 117-128.

²⁷"Subemployment" refers to the total of those unemployed, discouraged from seeking jobs, working but earning less than poverty wages, or working part-time when a full-time job was needed. For the context of these data and interesting comments on the value of labor statistics, as opposed to the need for improved manpower planning and development, see William R. Bechtel, "Area Data from a State Point of View," in *Selected Papers from North American Conference on Labor Statistics*, June 26-29, 1972, Washington, D.C.: U.S. Government Printing Office, 1972, an excerpt from which is included as Appendix E in this volume.

Employment

Data collected by the state employment security offices comes from a mandatory report submitted by every establishment covered by the state's unemployment insurance program. This employment and wages data file, referred to as the ES202 file, is used principally "for the administration of the state's unemployment insurance law, the Bureau of Economic Analysis' (U.S. Department of Commerce) personal income estimates and drawing samples for BLS reports."²⁸ Until recently, the data included about five-sixths of the jobs in the United States, two-thirds of those not included being in state and local government and the remainder being in domestic agriculture, small firms, and non-profit organizations. The recent extension of coverage of the unemployment insurance laws has brought small firms into this data file.

Although each state may require unique information in its "ES202" reporting system, common data collected by the states include monthly employment of workers covered by unemployment insurance, quarterly wages and unemployment insurance liability by establishment, the data being capable of being analyzed by industry and/or county.

Information on the characteristics of the insured unemployed is collected in the states via a random sample of those listed in their files of insured unemployed. Characteristics of the insured unemployment recorded in this file (referred to as ES203) include information about their duration of unemployment, age, sex, race, industry, and occupation. Of major concern to one who might attempt to use this information to assess relative levels of unemployment is the fact that the ratio of insured unemployed to total unemployed may vary substantially from area to area.²⁹

These data on the insured unemployed are the backbone of regularly issued estimates of local area unemployment. The overall unemployment level is estimated by adjusting the level of the insured by estimates of non-insured employment and other factors believed to determine area unemployment. Although the data are often used to determine the priority of an area for federal assistance funding under programs such as the Area Redevelopment Act, "a number of observers believe that the data, on the whole, are too crude to serve as criteria for determinations on area assistance."³⁰ While their value for assessing geographic manpower needs is seriously questioned, such aggregate estimates are

²⁸This and much of the following are taken from Malcolm S. Cohen, "Progress Report on the Feasibility of a Labor Market Information System," submitted to the Manpower Administration of the U.S. Department of Labor, Ann Arbor: University of Michigan, October 1971.

²⁹The labor market information system research at the University of Michigan reported that, in its analysis of three SMSAs, the insured unemployed averaged less than 45 percent of the total unemployed, and that figure fell to 20 percent for one of the urban areas (M. Cohen, 1971, p. 31). The inclusion of small firms under unemployment insurance will have raised these ratios.

³⁰S. Cohen, *Labor in the United States*, Columbus, Ohio: Merrill, 1970, p. 596.

even less useful for occupational or curricular analyses. The basic reason is that these insured unemployed based estimates do not contain any occupational breakdowns of their data. In other words, if the analyst wants to know something about the labor market difficulties experienced by terminees of particular vocational education programs, such as a welding program in Athens, Georgia, the analyst will require specific follow-up data from that program, and for comparative purposes, other programs that might be considered alternative manpower investments for the public or private purse.

Job Vacancy Statistics

Before turning to the discussion of follow-up information as valuable manpower supply and demand data, at least brief mention must be made of the nature and use of the state employment security agency's job vacancy statistics.³¹ Two kinds of job vacancy—as opposed to the forecast of net annual openings discussed above—statistics exist, those developed through the submission of job orders to the state employment agency as employers seek new recruits from that office, and those that exist as a result of the sampling of establishments in the agency's ES202 file of establishments. Job vacancies in manufacturing only currently are sampled by occupation on a quarterly basis in nineteen areas and on an annual basis in an additional nine areas.³² Job vacancy sample data on current manufacturing openings also is supplemented with data on those vacancies that have remained unfilled for thirty days or more. These are referred to as "hard-to-fill" openings, a high proportion of which reflect the likelihood of a more serious manpower imbalance between supply and demand.

It would not be unreasonable to use a persistent high level of hard-to-fill vacancies in an area as an indication that perhaps a relatively quick manpower training program would be warranted for such a location. However, the use of such data to justify a longer term program would be more hazardous. Wisconsin, for example, points out that their hard-to-fill openings may not be representative of the distribution of all openings. Exceptions to the representativeness of the distribution of such openings appear to be the "skilled construction trades where workers are usually hired through union hiring halls; the self-employed; some civil service openings because of their hiring procedures; and some skilled and professional occupations where job openings can be obtained through their own organizations."³³

Generally, considering problems in the use of these data for manpower planning, one might say that this uneven distribution of job vacancies across the occupational spectrum is biased toward those

³¹For a relatively thorough complete discussion of such data, see National Bureau of Economic Research, *The Measurement and Interpretation of Job Vacancies*, New York: NBER, 1966, and Myron L. Joseph, "Job Vacancy Measurement," *Journal of Human Resources*, Fall 1966.

³²Harold Goldstein, "Data Sources for State and Local Management Planning," paper, National Conference on State and Local Management Policy Planning, Salt Lake City, April 28, 1971, p. 8.

³³Wisconsin Department of Industry, Labor and Human Relations, Bureau of Research and Statistics, Occupational and Planning Research, *Occupational Opportunities Information for Wisconsin*, Madison, December 1972. See page 26 for an example of a page from their reports.

MILWAUKEE (SELECTED OCCUPATIONS)

OCCUPATIONAL TITLE	D.O.T. CODE	VOCATIONAL TECH. SCHOOL CLASS	UN- FILLED OPENINGS	% HARD TO FILL	GROWTH RATE TO 75 (US)	G S E D P	WAGE AND/OR REASON FOR HARD-TO-FILL	
							HR/WAGE	OTHER REASONS
Nursemaid	307.878 010	Home Econ	11-20	40-59	Moderate	3		
Companion	309.878 018		6-10	40-59	Moderate	3		
Bus Boy	311.878 010	Trade & Ind	11-20	80-100	Rapid	2		
Waiter Informal	311.878 058	Trade & Ind	50 +	60-79	Rapid	3	Up to 1.50	Wages Too Low to Attract Potential Applicants
Bartender	312.878 014		2-5	60-79	Rapid	3		
Cook	313.381 018	Trade & Ind	6-10	1-39	Rapid	4		
Cook Short Order	314.381 010	Trade & Ind	11-20	60-79	Rapid	7	2.50-2.99	Wages Too Low to Attract Potential Applicants
Cook	315.381 010	Trade & Ind	2-5	1-39	Rapid	4		
Pantryman	317.884 014		6-10	40-59	Rapid	3		
Kitchen Helper	318.887 010		21-30	1-39	Rapid	5		
Houseman	323.887 010		2-5	40-59	Rapid	1		
Maid	323.887 014		11-20	60-79	Rapid	2		
Cosmetologist	332.271 010	Home Econ	6-10	80-100	Rapid	2		
Nurse Aid	355.878 034	Trade & Ind	31-50	60-79	Rapid	4		
Presser Machine	363.782 018	Health Occ.	6-10	60-79	Moderate	3	2.00-2.49	
Guard	372.868 030	Trade & Ind	11-20	60-79	N. A.	4		
Charwoman	381.887 014	Trade & Ind	6-10	1-39	Decline	2		
Porter	391.887 030	Trade & Ind	11-20	40-59	Decline	2		
Janitor	382.884 010	Trade & Ind	6-10	1-39	Decline	3		
Window Cleaner	389.887 034		2-5	40-59	Moderate	2		
***Processing								
Molder	518.381 022	Trade & Ind	11-20	80-100	Slow	4		
Machine Molder	518.782 010		11-20	80-100	Slow	3		
Foundry Worker General	519.887 022	Trade & Ind	31-50	60-79	Slow	4	3.00-3.49	Limited or No Training Offered For This Occupation
Cannery Worker	529.886 010		2-5	0	N. A.	1	3.00-3.49	Unattractive Job Image
Tire Molder	553.885 242		2-5	80-100	N. A.	2		Adverse Working Conditions
Laborer General	589.886 022		6-10	60-79	Slow	2		
***Machine Trades								
Machinist	600.280 030	Trade & Ind	11-20	60-79	Moderate	4		
Machinist Apprentice	600.280 034	Trade & Ind	2-5	80-100	Moderate	7		
Maintenance Machinist	600.280 054	Trade & Ind	2-5	60-79	Moderate	4		
Job Setter	600.380 022	Trade & Ind	2-5	60-79	Moderate	4		
Machine Set-Up Operator	600.380 026	Trade & Ind	6-10	60-79	Moderate	6		
Tool-and-Die Maker	601.280 062	Trade & Ind	11-20	80-100	Moderate	4		
Tool-Machine Set-Up Operator	601.280 070	Trade & Ind	2-5	80-100	Moderate	7		
Gear-Cutting-Machine Set-Up Operator	602.380 010	Trade & Ind	2-5	60-79	Moderate	4		
Gear Hobber Set-Up Operator	602.782 010	Trade & Ind	2-5	80-100	Moderate	5		
Grinder Operator External to OL	603.280 010	Trade & Ind	2-5	80-100	Moderate	7		
Grinder Operator Internal to OL	603.280 014		2-5	60-79	Moderate	4		

Source: Wisconsin State Employment Service, *Occupational Opportunities Information for Wisconsin* (Madison: Department of Industry, Labor and Human Relations, June, 1970), p. 37.

{ Limited or No Training Offered For This Occupation
Unattractive Job Image
Adverse Working Conditions

{ Length of Training Discourages Potential Trainees

{ Length of Training Discourages Potential Trainees

jobs that provide only temporary employment, are non-union, and have low education-training requirements, rather than those jobs offering an opportunity for permanent employment and advancement. Also, one must remember that in a number of cases, hiring requirements for entry level jobs are higher than actually required for those jobs because of the promotional ladders within the firm. Consequently, to train only for the entry level positions would be to impede the trainees promotion within the firm. Third, there may be bottleneck—or relatively critical—vacancies, the filling of which will enable the employment of still more complementary staff, such as when the employment of a machine tool set-up man will enable the employment of a number of semi-skilled machine operators. A fourth problem in using vacancies to determine training needs is that redundant vacancies may exist, so that when one employer acquires an employee of given talents, it will enable that employer to move into a market and compete away the vacancies reported by other firms. This would be the case where employers compete for the same contract, file vacancies in anticipation of that contract, but only one of the competing employers gets the contract, wiping out the vacancies filed by the others. Thus, the sum of vacancies may not be equal to the sum of people that will be employed. Fifth, when the number of vacancies is due to the relatively low level of wages offered, to use the vacancy data as an index for training priority would tend to perpetuate the relatively low wages and thereby the limited labor supply. Finally, reported job vacancies may reflect not only the demand for a particular quality of skilled labor but also the fact that on-the-job training is taking place to alleviate the shortfall in the labor supply. This “healthy adjustment process” may eventually relieve the underlying shortage without the establishment of formal instructional programs.³⁴ In general, one must conclude that while job vacancy statistics may be very helpful in assessing the need for relatively quick training programs, considerable caution must be used along with the data.³⁵

FOLLOW-UP INFORMATION

Rationale for Follow-up Data

“Follow-up information” generally refers to the data and their analysis pertaining to the experience of trainees, graduates, or dropouts, after they terminate their educational or training experience. This information is terribly important for several reasons. First, follow-up data is critical information for any accountability analysis of the impact of manpower or educational programs upon the labor market success of its students. In other words, once the guesstimates have been made about net openings, the programs planned and implemented, and the students graduated, the follow-up system will tell planners whether students wanted, could find, took, liked, and/or succeeded in jobs for which their curricula prepared them. Follow-up data then tells the analyst how the real demand in the labor market is affecting the supply prepared by the training program.

³⁴Michael J. Piore, “On-the-Job Training and Adjustment to Technological Change,” *Journal of Human Resources*, Fall 1968.

³⁵A member of the National Industrial Conference Board has questioned the cost-effectiveness of vacancy statistics, based on questions he raises about the quality of the data and the direct and indirect (employer) costs to society. John C. Myers, “Comments on the Usefulness of JOLTS,” in *Selected Papers from the North American Conference on Labor Statistics*, June 26-29, 1972, pp. 84-87.

A second reason for adding follow-up information to an MIS is to facilitate the planning process, for formulation of a rational plan is impossible without some information about the likely impact of alternative resource allocations. Follow-up data may play several roles in the occupational education planning process. It may be used to assess the overall geographic distribution of labor market difficulties experienced by vocational education's potential clientele. If the follow-up unemployment rate of youths from high school X is four times as high as the unemployment rate from school Y, that would be a good argument, student preferences permitting and other things being equal, to supply a relatively large portion of funds to school Y. In addition to its value in assessing the geographic distribution of the need for vocational education resources, follow-up data is also invaluable for the assessment of the importance of supplying resources to particular curricula. If a curriculum's students are typically very unhappy with their jobs, and receive poverty wages, it would be difficult to argue that vocational education should subsidize such training, even if there were a substantial number of job openings forecast for the area. Finally, in addition to their value in determining geographic and curricular priorities for funding, follow-up data also are valuable for identifying those clientele most in need of labor market assistance and even, depending on the nature of the follow-up, something about the nature of the assistance needed. For example, if it is found that blacks, well-trained as welders are unable to get related jobs while whites with the same training and given the same job information by instructors and counselors, all get related jobs, this would imply the need for legal assistance for the blacks. Or, if general education graduates of similar aptitudes have an unemployment rate twice that of the vocational education graduates, this would seem to argue for more vocational education opportunities for those students who would prefer vocational education and would otherwise be forced into the general education track.³⁶

And still a third reason for follow-up data is to facilitate research on the process of occupational preparation and entrance into the labor market. The latter argument, however, must be restrained in its implementation, for to design an information system to meet all the data requirements for research would quickly overwhelm the information system's resources. The MIS follow-up data could be used, however, to provide broad guidelines for the design of more intensive research studies.

Need for Comprehensive Follow-up Systems

Follow-up information is important because once the a priori arguments supporting one curriculum over another are over, such arguments can only be resolved through the analysis of empirical data. Nor will the national sample studies of the Departments of Labor or Health, Education, and Welfare resolve the disputes that arise between specific state legislatures and their respective departments of education, or between those departments of education and their respective local educational agencies. When threatened with a particular report based on such a national sample, the local agencies

³⁶For a planning model that utilizes follow-up data to geographically distribute state and federal dollars, to determine curriculum priorities, and to allocate resources among curricula, see Young, Clive, and Miles, *Vocational Education Planning*, Chapter 4.

simply retort that the national data do not reflect the environment or quality of their local programs. The only means for resolving whether local programs are effective is to implement an assessment of those specific local programs. For example, whereas state data might indicate that chemical technology courses were relatively unsuccessful, a particular local program located in the same area as a large chemical firm might generate very successful graduates. The identification of such specific successful programs would be impossible without a relatively comprehensive follow-up system in the state.³⁷

Another way to view the need for comprehensive follow-up data is to consider it as a part of the data necessary to implement an audit of a program. Not all programs are subjected to formal audits, but all programs are required to maintain the data necessary to implement an audit. Cost data for audits are routinely kept by managers, and it would be fiscal irresponsibility for them not to do so. Similarly, one can make a strong argument that it is equally irresponsible for program managers not to have available for potential auditors (e.g., state auditors, parents, and/or students) information, including follow-up, about student successes and failures. To fail to provide auditors such output data is to negate the analytical value of their routine cost data.

³⁷The hardened administrator will, of course, immediately argue that such a comprehensive follow-up system would be terribly expensive. To which the hardened systems analyst would retort that, granted that the data is not costless, one must remember, however, to put the cost of the follow-up data in perspective and to consider ways through which the cost of the data may be cut but still be locally specific. In terms of the perspective from which to view the cost of a comprehensive follow-up system, one could argue that the whole purpose of the educational system is to prepare youth for their transition to adulthood, and unless we have information on which programs are doing a reasonable job of facilitating that transition and which ones are not, there would seem little reason for hope of improving the process. Also, one might argue that follow-up data is simply an expenditure for R&D information, and that in view of the fact that hundreds of dollars are spent on each child each year he is in school, it would seem a bit unreasonable to quibble over the expenditure of a few dollars to find out how successful those thousands of dollars were in preparing the child. Although arguments can be made for an annual follow-up of all of a year's terminees, a state's follow-up costs could be substantially reduced by splitting the state up into two or three geographic areas and rotating the state's follow-up efforts through those areas on a cyclic basis. One argument for so doing is that when a poor program is identified, one cannot expect that program to be turned around immediately. Hiring new staff, easing old staff into other positions or retraining them, revising the curriculum, etc., takes time, and one would not expect efforts to revitalize a curriculum to yield an immediate improvement in statistics for a program. The arguments for a comprehensive analysis of all terminees from all areas of the state each year include the following: (1) it would regularize the process, and therefore the local staff would become more familiar with the routines necessary for the successful implementation of the system; (2) this regularization of the process also would facilitate the familiarization of staff, students, advisory groups, and funding authorities with the existence of the data, their strengths, weaknesses, and potential uses; and (3) it would eliminate the problems in comparing sets of data from areas in the state covered during different survey cycles. The latter set of problems might arise when the state goes through an economic cycle over a period of years, so that the data from one area might be collected during the peak in the cycle and data from another area reflecting the cycle's trough. If one were to compare the data from such areas without adjusting it for the cycles, which might be a tricky process, fund allocations might be distorted due to the cycles rather than to the quality of programs. Once the system is initiated, feedback of the data to local areas can generate substantial interest in the process, program evaluation, and the availability of more data in the future. Such interest, of course, facilitates future budgetary decisions to refund such data.

Not Just Vocational Follow-Ups

The rationale supporting follow-ups in vocational education are just as strong in other curricular areas. As follow-ups are critical for alternative analysis within vocational education, so they are equally important for graduates and dropouts outside vocational education. Before drawing conclusions from follow-up data about the labor market success of vocational trainees, the analyst would like to know how well the trainees from general education, college preparatory, junior college, correspondence, private technical or business, and four year degree programs were doing after they left their programs, all of which are obvious alternatives to vocational allocations. With the increasing crunch of the labor market upon graduates and dropouts from all of these programs, it would seem a fair guess to expect society to begin demanding follow-up reports not just from vocational and manpower programs but also from these other alternatives as well.

Types of Follow-up Information

Training Related Placement Rate: This is the most common information gathered by follow-up studies evaluating occupational education programs, the reason for its widespread development being that the U.S. Office of Education requires annual placement rate reporting. This criterion, as traditionally applied, would rate a program more highly if a large portion of its graduates took jobs with skill requirements related to the subject matter of the curriculum. As usually presented, it would consider only the percent of trainees seeking employment who took related jobs, thereby sidestepping the problem of evaluating whether those going on into the military, housekeeping, or higher education should represent pluses or minuses on the curriculum's scorecard.³⁸

This related placement information is important demand data because it casts light on the impact of the training program upon the net openings forecasts used in planning. That is, if a large number of students were trained to fill a large number of openings forecast for sales clerks, the related placement data will explain the impact of that training upon those openings. Or, if students did not take related openings, it may cast light upon whether the forecast was realistic or not: did the students find openings when they looked for them? Or did the placement service fail to inform the students about openings that did exist?

Exaggerated emphasis upon the related placement rate as an evaluation criterion—particularly at the secondary level of training—overlooks several important considerations: (1) students enroll in programs for reasons other than career interests: they want to keep their car working, it's the easiest route to the diploma, or because a close friend did so; (2) vocational education may be of substantial value in its role as a means to stimulate academic achievement; (3) youth often change their career interests, and a program that extends a student's occupational horizons, including a search beyond

³⁸For an example of thinking surrounding acceptance of this criterion, see David J. Pucel, *The Minnesota Vocational Follow-up System: Rationale and Methods*, Minneapolis: University of Minnesota, 1973, pp. 12-13 and 23.

related occupations, should not be penalized for so doing;³⁹ and (4) if a vocational program does successfully retain students, the students may well pick up and utilize social or cultural talents that may be just as important to their careers as occupationally specific skills.

Perhaps the problems in using the training related placement rate are best illustrated with two examples: (1) even with a very high training related placement rate, a program presumably should be terminated if its graduates earn low incomes and experience little job satisfaction; and (2) even with a very low training related placement rate, one should hesitate to eliminate a program when its graduates earn high wages and achieve high levels of job satisfaction. If these two examples are reasonable, then the evaluator or planner would seem well advised to ease training related placement out of its traditional evaluation role and search for more general indices of the success of program graduates, such as income, employment, job satisfaction, or "acceptable career progress."

Acceptable Career Progress: To eliminate the necessity for vocational educators to apologize when their students enter degree programs, unrelated jobs, and homemaking, perhaps vocational education should adopt a new criterion: adequate career progress for its students. The concept of acceptable career progress would enable vocational education to get away from its hang-ups concerning "available for placement" and "related placement." It would recognize that there are many subtleties in the educational process that may validate vocational education programs even in the face of low related placement rates, many very acceptable reasons for other than related placement (military service, higher education, housewifery, illness, etc.), many reasons for examining low placement rates (Why are they low? How does related placement correlate with more appropriate criteria? etc.), and many more circumspect concepts to apply in evaluation. In other words, instead of states being obsessed with their related placement rates, they would be concerned with the proportion of their terminees who were trying but unable to find employment or who were discouraged from seeking work because of the low offers they had received earlier. Here, clearly, is where the attention needs to be focused, rather than on those who are making acceptable career progress but just don't happen to be in a related job.

Income: The collection and analysis of follow-up data pertaining to the income of former occupational training students adds an important qualitative dimension to the assessment of manpower demand. While measurement of the employment and unemployment of students yields a quantitative index of their job seeking success, an assessment of their income reflects, from a very important perspective, the quality of the jobs they have acquired. Although there clearly are other important perspectives from which the career progress of students may be assessed (e.g., job satisfaction, skill performance on the job, etc.), income may be thought of as an index synthesizing the impact of the interaction of supply and demand upon the terminee's prospects for status, health, incentives, and economic security. Income is often conceived by labor market analysts as a reflection not only of the value of a job to the incumbent but also the value society is willing to pay for the performance of a job.

³⁹That there is no apparent economic advantage to taking a related job was noted in an earlier footnote.

To exclude income information from an assessment of the demand for graduates from a particular program, would be to overlook one of the most important of the manpower demand parameters. The kind of follow-up income information that would be most useful would, of course, be relatively comprehensive so that the incomes of graduates or dropouts from specific programs—for example, the welding program in Jones Comprehensive High School—could be compared to each other. As mentioned above, such information would be useful not only for vocational or occupationally specific programs but also for the general, college preparatory, and various forms of post-secondary programs. It also would be quite useful to have not just short-term income data but also that pertaining to the success of the students over the longer term, say, three to five years after leaving school.⁴⁰

Job Satisfaction: Although it is obviously somewhat correlated with the previous criterion, if the manpower demand information system collects follow-up data, it would be extremely helpful if that follow-up data included evidence concerning the job satisfaction achieved by students from programs identified in specific curricular and geographic terms. Although this is not “demand information” in the traditional sense, it does reflect the employees’ appraisals of their satisfaction with the total terms and conditions offered to them and under which they must work. This will enable the information system to assess not just the pecuniary aspects of the work environment for trainees but also their overall psychological appraisal of the value of their employers’ job offerings. This may be interpreted as a part of the demand package because some of the important benefits for some positions are noneconomic benefits, some of which are deliberately built into jobs by employers and some of which simply accrue to the job-holder as a result of the nature of such jobs. An example of the former would be the deliberate reduction of noise levels or air-conditioning of the work sites by employers. An example of the latter would be the somewhat elevated status held by university professors, not as a function of their income or a deliberate university policy, but rather as a result of the respect traditionally held by education. To the extent that job satisfaction is manipulable by employers and is part of the total reward package offered to their employees, job satisfaction may be seen as another dimension of manpower demand which is important and may be collected by the follow-up system. The effects of both causes of job satisfaction, however, are useful for occupational training planning and may be collected through the follow-up system.

The quality of research into the job satisfaction of vocational education trainees is, in the words of Little,⁴¹ “fragmentary and sporadic.” That there is reason for anticipating significant

⁴⁰In the absence of any income information from follow-ups, one might substitute, until such program specific data can be gathered, information from reports such as that illustrated in Appendix G. The weakness of using such general survey data for planning or evaluation purposes is readily apparent: such general surveys yield only average wage information and thereby do not reveal to the planner the earnings of those coming from distinguishable preparatory tracks. In other words, looking at the BLS’s survey data, one would not have been able to determine whether, for example, given groups with similar aptitudes, vocational education students earned incomes any higher than students from other training avenues. Another proxy for the probable earnings of graduates from various programs would be the wage data collected by various employer councils.

⁴¹J. Kenneth Little, *Review and Synthesis of Research on the Placement and Follow-up of Vocational Education Students*, Columbus, Ohio: The Ohio State University, The Center for Vocational and Technical Education, 1970, p. 24.

Pucel, Nelson, and Wheeler, for example, reported no significant difference, within three curricular clusters (with 3, 3, and 2 curricula within the clusters) between the satisfaction of students with their job and the amount

differences in the job satisfaction consequences of alternative manpower preparation programs stems from evidence such as the following: "All studies, both in the United States and other industrial nations, show a clear connection between overall job satisfaction and social status, using gross indices of occupational status."⁴² Thus, if the vocational education planner believes that his plans affect the eventual socioeconomic status of students, then there is reason to believe that it affects their job satisfaction. If the structure of occupational preparation affects job satisfaction, then it would be highly useful to collect measures of such impacts via the follow-up survey.

Mobility Potential: Many educators and manpower planners are interested in vocational education because of its contribution to the student's mobility potential. In the case of geographic mobility, the object would be to enhance the ability of trainees to move from locations with poor economic opportunities to those with improved prospects. The ability of trainees to make such moves may be measured through geographic mobility questions on the follow-up questionnaire. The analysis is not, however, a simple one. Simply the fact that a large proportion of students move is not necessarily reflective of a powerful occupational preparation curriculum. It may reflect one that is not well tuned to attractive local manpower needs. Where local manpower needs are minimal, however, where local jobs offered yield poverty level incomes, and where the success of occupational education movers is significantly better than that experienced by general education movers, then one may begin to conclude that the manpower program does enhance geographic mobility prospects.

The kinds of follow-up data that would be helpful in resolving these questions include that pertaining to the location of training, location of first and current jobs, distance between training and jobs, reason for moving, relatedness of the job to the training, and whether the manpower program facilitated or hindered the move. These data will, it is hoped, help avoid the planning of programs that force mobility where local options are attractive and open to the well trained and also facilitate mobility where local options are unattractive.

In addition to their concern with the curriculum's contribution to geographic mobility, educational and manpower planners also are highly concerned about the potential of alternative curricula for enhancing the student's long-term prospects in a dynamic labor market. In other words, it is hoped that the training will facilitate, but not require, other forms of successful mobility as well: interfirm, occupational, and labor force mobility.⁴³ A curriculum may facilitate these forms of

(not the kind) of training they received. This data does not say, however, that there are not significant differences in job satisfaction levels earned by graduates from the different curricula. David J. Pucel, Howard F. Nelson, and David N. Wheeler, *A Comparison of the Employment Success of Vocational-Technical School Graduates, Dropouts, and Persons Not Admitted to Vocational Programs*, Minneapolis: University of Minnesota, Department of Industrial Education, 1971, p. 17.

⁴²John P. Robinson, "Occupational Norms and Differences in Job Satisfaction: A Summary of Survey Research Evidence," in John P. Robinson, Robert Athanasiou, and Kendra B. Head, *Measures of Occupational Attitudes and Occupational Characteristics*, Appendix A to *Measures of Political Attitudes*, Ann Arbor: University of Michigan, Institute for Social Research, Survey Research Center, 1969, p. 65.

⁴³The latter, the ability to exit and reenter the labor force without substantial economic penalty, would be particularly important for young women who frequently intend to work for a period during and/or after completion of their schooling, then drop out of the labor force for childbearing and/or raising, and then reenter the labor force upon release from their full-time child care obligations.

potential mobility by developing relatively generalized skills. The development of more generalized occupational curricula may be done through cluster curricula that try to convey common skills required for a set of related occupations (e.g., health occupations) or through the supplementation of the job skill development with a strong dosage of general or "academic" skills, that are useful across a wide array of occupations (e.g., mathematics and communicative skills).

As was true in the above discussion of potential geographic mobility, in examining other forms of mobility it is equally important to maximize potential successful mobility rather than mobility itself.⁴⁴ To determine such an effect of training upon mobility, one would have to analyze voluntary and involuntary mobility, as well as the related success parameters of income, employment, and job satisfaction, perhaps examining with particular interest, those experiencing technological or industrial dislocation.

Whether or not a particular curriculum actually provides the student with sufficiently generalized talents to enable him to make the occupational shifts he is likely to encounter during his career cannot be resolved on a priori grounds. Whether a curriculum provides the student with potential mobility, whether it is too narrow or too broad, can only be resolved empirically, through an analysis of the follow-up data suggested above. What really must be analyzed, then, is the ability of students from particular curricula to respond to fluctuations in the structure of manpower demand: those coming from curricula with either strong and continuous long-run related occupational demand or a sufficiently broad base of curricular subject matter will deal with the changing manpower structure successfully. Follow-up data, in conjunction with manpower trend information, should facilitate the design of such curricula.

⁴⁴The national longitudinal survey, conducted through the cooperation of the U.S.D.L.'s Manpower Administration, the Bureau of the Census, and the Center for Human Resource Research at The Ohio State University, has documented some of the problems in assuming that mobility is always a good thing. For example, among white male youth who were out of school between 1966 and 1969 and who were wage and salary workers, there was a tendency for "diminishing returns to mobility," yet even after the "returns to mobility" were earned, the mobile were generally only closing the gap between themselves and the non-job changers. A probable explanation of the lower percentage increase for those who moved frequently appears to be that there were more involuntary movers among that group than among those who made only one job shift. Blacks in a similar cohort did not seem to experience these diminishing returns. Andrew I. Kohen, with the assistance of Paul Andrisani, *Career Thresholds: A Longitudinal Study of the Educational and Labor Market Experience of Male Youth*, Volume 4, Columbus, Ohio: The Ohio State University, Center for Human Resource Research, 1973, pp. 59-60.

SUMMARY AND RECOMMENDATIONS

SUMMARY

The billions of dollars now being invested in education and manpower programs, the intended purpose of such programs being at least partially to serve the manpower needs of the nation, and the gross shortcomings in the nation's manpower information system require new data sources for the monitoring and forecasting of the manpower structure.

Demand is dealt with in the present volume both in terms of the quantity employed in a particular occupation, or likely to be employed, as well as in terms of the quality of those jobs, as reflected in wages and job satisfaction. Typically, when manpower analysis is discussed by non-economists, the qualitative dimension of the analysis, wages, and other job benefits are excluded from the discussion, with analytical energies focusing solely on the magnitude of the forecast. This report argues that wages and job satisfaction are particularly important for they reflect the interest of the employer in inducing labor into the occupation as well as the benefits likely to be received by a trainee upon his entry into the labor market.

The U.S. Department of Labor has recognized that the quality of information available for state and local manpower planning falls far short of the optimum. Consequently, the USDL has embarked on several new manpower information development programs, among the more significant of these being: (1) *Tomorrow's Manpower Needs* forecasts; (2) special processing of 1970 census data; (3) development of the new Occupational Employment Statistics program; and (4) the development of a larger, highly detailed (forecasts for approximately 2,000 occupations) national, state, and local matrix forecasting system. The nature of these projects and their current status is discussed.

Given the significance of its potential to the manpower planning community, considerable discussion is given to the Occupational Employment Statistics program, variations on its theme, and their allied forecasting matrix. Particular attention is paid to the Colorado project, in which the state vocational education agency and the state employment security agency have a cooperative agreement for the collection and processing of manpower information. Purposes, problems, and prospects are discussed, along with the reasons that personnel both inside and outside the state are encouraged with the prospects.

In addition to occupational forecasts, other varieties and sources of manpower information are examined and discussed. Among these are state employment and unemployment data, job vacancy statistics, and follow-up data. Pros and cons of each are examined along with their roles in planning occupational programs.

RECOMMENDATIONS

More attention must be given to the problem of the extent to which jobs are filled and vacancies created by occupational mobility, on which, as opposed to the estimates of openings due to growth and attrition, we have little information. This analysis might be undertaken for a few critical occupations, critical in terms of the large numbers involved, the cost of training to the community, or the importance of the service to the community.

Better cost and benefit data than is currently available must be generated for alternative data collection, analysis, and utilization procedures: Is it really cost-effective to utilize large numbers of vocational education or manpower training staff to collect OES data, or should more intensive mail-out techniques be developed?

Better techniques must be implemented for the collection, analysis, and utilization of follow-up data. This is a grossly underutilized aspect of manpower planning and its role is expected to expand substantially in the near future, not just for occupational education planning but also for the various forms of higher education. The cost of a greatly expanded follow-up system, although not insignificant in absolute terms, is appraised as reasonable in view of the importance of the data for program evaluation and auditing, the importance of the programs being evaluated, the cost of the educational and training programs themselves, and the potential savings that might be effected through more effective program design.

APPENDICES

APPENDIX A

COLORADO AGREEMENT

THIS AGREEMENT, made this 25th day of August,
by and between the Division of Employment of the Colorado Department of
Labor and Employment, herein called "Division," and the State Board for
Community Colleges and Occupational Education of the Colorado Commission
of Higher Education, herein called "State Board."

WITNESSETH:

WHEREAS, it is the policy and desire of the Division to collect
and disseminate to public officials performing their public duties, state-
wide and area information regarding occupational employment and projected
occupational demand in the State of Colorado, and

WHEREAS, the Division is bound by certain confidentiality
requirements as set forth in federal statutes and regulations and in
Section 82-3-7; Colorado Revised Statutes 1963 as amended, and

WHEREAS, there is always the question of when is a public offi-
cial performing his public duty, or an agent thereof so performing, and

WHEREAS, the State Board is continuously undertaking studies
and research projects and is responsible for planning, funding, and evalu-
ating programs of vocational education in Colorado and represents it
is duly authorized and legally justified in so doing, and requires such
information and projections from the Division as is set forth in Schedule
"A" attached hereto, and by this reference thereby made a part thereof,
and including the definitions therein, and

WHEREAS, it is acknowledged by both parties hereto that the
use of field employees and agents for data collection and the use of
computers and third party consultants and contractors heightens the
possibilities for breach of confidentiality requirements hereinabove
set forth,

NOW, THEREFORE, in consideration of the Agreement by the
Division to collect and supply the information set forth in Schedule "A",

on the basis set forth therein, it is agreed by the State Board that such information shall be handled by the State Board as agent for the Division in, and only, the manner herein set forth:

1) The State Board hereby agrees that it is and will be bound by and subject to all provisions of federal statutes and regulations governing the cooperative Manpower Administration/Bureau of Labor Statistics/State Employment Security Agencies' Occupational Employment Statistics Program, accepting, for the purposes hereof, the designation as Agent for the Division.

2) The State Board hereby agrees that it is and will be bound by and subject to all provisions of the Colorado Employment Security Act, Chapter 82 Colorado Revised Statutes 1963 as now or hereafter amended, including, without limitation, Section 82-3-7, and 82-11-1 (3) thereof, accepting, for the purposes hereof, the designation as agent for the Division.

3) Anything to the contrary herein notwithstanding, in no event shall the State Board or its employees, agents, licensees or sub-contractors divulge either directly or indirectly to persons not subject to this agreement, any information in any manner revealing an individual's or employing unit's identity as prohibited by federal statutes and regulations and by the Colorado Employment Security Act aforesaid.

4) The State Board agrees to notify and advise all employees, agents, licensees, or sub-contractors of the said requirements of confidentiality and of the possible penalties and fines imposed by violations thereof, and to secure from each an acknowledgement of such advisement and an agreement to be bound by the terms of this agreement as an employee, agent, licensee or sub-contractor of the State Board, as the case may be.

5) The State Board agrees not to breach the confidentiality requirements as set forth in Section 82-3-7; Colorado Revised Statutes 1963 as amended, and relevant federal statutes and regulations.

6) In all third party agreements and arrangements, the State Board shall require said third party agents to agree to indemnify and

hold harmless the Division and the State of Colorado from any and all liabilities claims, or causes of action arising out of or on account of failure of said third party or its employees, agents, licensees, or sub-contractors to maintain or preserve the confidentiality aforesaid.

7) Any such breach by the State Board or said third party agents shall constitute good cause for the Division to forthwith cancel this Agreement, without liability therefore, and to cease supplying information; all and any information therefore delivered shall forthwith be returned to the Division. Notwithstanding the foregoing, the obligations herein set forth concerning confidentiality and the obligations of the State Board, its employees, agents, licensees, and sub-contractors shall survive such cancellation and continue in force and effect. Any Division waiver of an alleged breach shall not be construed to imply waiver of any subsequent breach.

8) Notwithstanding any further or more detailed restrictions in Schedule "A" contained, which shall also be part of this Agreement as is fully set forth herein, the following minimum requirements shall at all times prevail.

(a) No data shall be disseminated or published at any occupation, geographic area, industry, Federal Department or Federal Agency level which:

(1) Are based upon data collected from fewer than three establishments which must be in different employing units (as defined in Section 82-1-3 (4), Colorado Revised Statutes 1963 as amended) and/or Federal Installations (a single physical unit engaged in one or predominantly one type of governmental activity).

(11) Are based upon data collected from fewer than three employing units (as defined in Section 82-1-3 (4), Colorado Revised Statutes 1963 as amended) or Federal Installations representing 80 percent or more of the total employment at any level in the universe.

Provided, however, that said dissemination or publication may occur when said data in question is "folded back" to the next detailed level able to meet the confidentiality requirements of this paragraph.

9) The Division shall be the sole determinor of methods and procedures to be used when confidential data is collected by, used by, or material therefrom is used by, third party personnel who and which are not covered by Schedule "A" and then only after prior authorization by the Division.

10) Anything to the contrary herein notwithstanding, it is agreed by the State Board for itself, its employees, agents, licensees, and sub-contractors that title to and ownership of all material, information and data made available by the Division shall be and remain in the Division at all times, herein, notwithstanding temporary possession by the State Board.

11) This Agreement shall terminate two years from the date hereof, unless sooner terminated as set forth above, or unless extended by mutual written Agreement of the parties hereto for additional terms not to exceed two years each in duration; notwithstanding the foregoing; this Agreement may be terminated by either party upon thirty (30) days notice to the other subject to the provisions of paragraph 6) herein.

This constitutes with attachments the entire Agreement of the parties hereto.

DIVISION OF EMPLOYMENT

By James P. Wilcox
James P. Wilcox, Director
Date August 24, 1972

STATE BOARD FOR COMMUNITY COLLEGES
AND OCCUPATIONAL EDUCATION

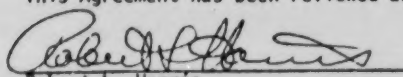
By M. G. Linson
M. G. Linson, Director of
Occupational Education and
Executive Secretary for the
State Board

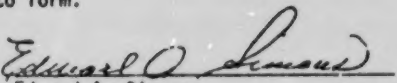
Date Aug 18, 72

DEPARTMENT OF LABOR AND
EMPLOYMENT

By James M. Shaffer
James M. Shaffer
Executive Director
Date 8-25-72

This Agreement has been reviewed as to form.


Robert L. Harris
Assistant Attorney General for the
Division of Employment


Edward A. Simons
Assistant Attorney General for the
State Board for Community Colleges
and Occupational Education

Date August 22, 1972

Date August 21, 1972

SCHEDULE "A"

COOPERATIVE AGREEMENT BETWEEN

The Department of Labor and Employment, Division of Employment
and
The Department of Higher Education, State Board for
Community Colleges and Occupational Education

Project Objectives, Scope, Procedures And Requirements

Background

The manpower and educational legislation of the past decade has continuously underscored the need for more and better information concerning current and future local labor market conditions and the requirement for assessing performance and fixing accountability in the vocational education and manpower programs. Information on current occupational skill requirements is essential to the development of a comprehensive system of labor market information called for by Section 106 of the Manpower Development and Training Act of 1962, as amended. This Act stipulates that "the Secretary of Labor shall develop, compile, and make available, in such manner as he deems appropriate, information regarding skill requirements, occupational outlook, job opportunities, labor supply in various skills and employment trends on a national, State, area, or other appropriate bases which shall be used in the education, training, counseling, and placement activities performed under this Act."

The implementation procedures for the Vocational Education Act of 1963, as amended, call for the development of State vocational education plans that take into consideration projections of occupational requirements. The objective of this legislation addresses itself to directing vocational training programs to reflect current and long-range needs for trained manpower. Projection of State and local occupational requirements is essential if, as the Vocational Education Act of 1963 required, "programs be conducted in areas of proven occupational needs."

Such federal legislation has for some years recognized the need for reliable information on the present and future occupational employment opportunities at the local level as a necessary guide to the development of job related training and educational programs. The legislation has charged the State employment security agencies with the responsibility for preparing such information.

Purpose

Recent moves by the federal administration and Congress to decentralize manpower activities adds further to the demands for more information on current and future State and local labor market conditions. Information on present and future employment opportunities at the State and local level is critical in planning for job related educational programs such as vocational education, if waste of both financial and human resources is to be avoided.

Systematic and intelligent action to deal with imbalances between the demand and supply of workers for specific occupations must be based on projections of manpower requirements and resources--nationally, and for States and areas. These, in turn, require for their preparation, comparable series of statistical data on employment by occupation that are kept up to date. This necessitates the development of a system for collecting occupational employment statistics on a recurring basis and in a manner that will permit estimates by industry at the national, State, and area levels.

The thrust of federal legislation over the last decade and recent Colorado legislation redirecting the State's vocational education programs, clearly highlights the need for comprehensive occupational employment statistics by education, manpower, planning and development agencies to serve as the basis for:

1. Evaluating the extent to which public and private training programs are adding to the supply of trained workers;
2. Evaluating the effects of shifts in public and private demand and changes in technology and industrial organization on occupational manpower requirements;
3. Assuring that local manpower conditions and problems are adequately understood and considered in establishing and adjusting government programs and priorities;
4. Preparing and disseminating accurate, up-to-date information for vocational counseling of the work force, including veterans, youth, the disadvantaged, minorities, and others;
5. Planning and promoting the economic development of the State and particularly those rural and less populated areas of the State which desire to encourage such development as well as areas and neighborhoods with high chronic unemployment;
6. Determining whether ongoing and proposed vocational education programs meet an employment potential which is found to exist by competent surveys concerning economic opportunities.

Scope

It is the policy of the Division of Employment to produce and disseminate certain statewide and area information on the manpower needs, employment, unemployment, and employing units of the State of Colorado insofar as the mandatory confidentiality of an individual's and an employer's information can be maintained. There remains, however, the requirement for public officials to be able to make effective joint and diverse decisions concerning the well being of persons being educated for work, the worker, the employer, the unemployed and underemployed as they relate to their social and ecological environments, jobs and job opportunities in the State of Colorado. These decisions, being as complex as they are, continue to require more refined and ever increasingly detailed data. It is to facilitate this continuing and expanding need that this cooperative agreement is undertaken.

The State Board has been designated by the State Legislature and the Federal Government as the primary agency for planning, funding, administering and evaluating the Federal-State-Local vocational education programs in Colorado. The State Board has entered into a cooperative arrangement with the Colorado State Employment Service of the Division under provision of Section 123. (a) (8) of the Vocational Education Act of 1963, as amended, and has entered into an agreement with the Center for Vocational and Technical Education at Ohio State University to serve as a pilot state for the development of a Management Information System for Vocational Education under a research grant from the U. S. Office of Education. The State Board has been in the process of re-evaluating its role, function and the dedication of its resources to more fully meet the goals of the State Vocational Education Plan and those of the State and Area Comprehensive Manpower Plans. Consistent with attaining the above plan goals, the State Board recognizes the close interdependence of the Division and itself in the development of occupation demand and supply information and the benefits to be derived from reinforcing the role of the Division as the primary deliverer of placement services to students completing vocational education programs.

Scope (continued)

It is agreed that the Division and the State Board will cooperate and coordinate their efforts to supplement the Division's work in the Occupational Employment Statistics Program and to accelerate the development of a State industry-occupation matrix within the integrated National-State Industry-Occupation Matrix System. Both programs will be carried out in conformity with the guidelines, standards, methods and procedures, and definitions contained in Appendices 1. and 2. of Schedule "A" as jointly issued by the Manpower Administration and the Bureau of Labor Statistics of the U. S. Department of Labor, and in any future issuances governing the above programs. The supplementation of the Occupational Employment Statistics Program and the acceleration of the State Industry-Occupation Matrix will be carried out to the fullest extent possible with available resources, provided however, that in so doing, the Division's commitments and obligations under the national programs are not neglected or carried out with less efficiency.

It is deemed in the interest of the Division and its function of accomplishing and encouraging employment stabilization that such cooperative effort described herein be undertaken with the State Board so that the latter may more effectively match occupational skills education and training for the work force with employment opportunities.

This does not necessitate the Division or the State Board bringing any resources other than those provided for in the respective agencies' occupational information programs and the available relevant data to this Agreement. To the extent that the Division and the State Board can provide additional resources each will, provided that in so doing, neither agency is required to neglect nor to carry on with less efficiency its own programs that have overriding priorities.

Project Plan and Responsibilities

The general plan is to utilize the Occupation Employment Statistics Program gathering system (to which the Colorado agency is committed beginning with the non-manufacturing phase) to gather data on the manufacturing segment of the economy that was done by the states initially involved in the program. For the non-manufacturing survey, to be started in the near future, and the manufacturing survey supplement, the sample will be expanded in order to provide reliable statistical data for the Pueblo and Colorado Springs Standard Metropolitan Statistical Areas and four Occupational Education Planning Regions, in addition to the Denver SMSA and the State. The four Occupational Education Planning Regions are consolidations of the twelve State Planning Regions established by the Governor to comply with Federal Executive Order A-95.

Informationally, the supplemental manufacturing survey will place our informational system more in line with the other states. It is realized that our reference period will not be the same because of a possible difference in benchmark period used. Because of the relatively small number of manufacturing establishments in Colorado (less than 2,000) and their geographic distribution, the OES supplementary survey will be a universe survey with the possible exception of the Denver SMSA. This will also allow the same area supplementation objectives of the non-manufacturing survey to be met. The non-manufacturing survey sample (originally estimated at about 800 firms) will be expanded, especially in the areas outside of the Standard Metropolitan Statistical areas in order to produce reliable information. This additional work load will be absorbed by personnel on the State Board staff. Field personnel normally on nine month contracts will be trained and utilized in this supplementary project and their contracts will be extended to eleven (11) months. It is estimated that throughout each year, approximately 36 man-months of assistance will be available when field survey work is underway.

Project Plan and Responsibilities (continued)

Mail schedules will be used in the concentrated metropolitan areas, but personal visits by State Board staff will be utilized to the greatest extent possible. All data will be collected using BLS/MA-OES schedules, books of definitions, and supplements as authorized by the Office of Management and Budget.

Responsibilities of various aspects of this project will be delegated in the following manner:

A. The Colorado Division of Employment

1. complete technical supervision of the project
2. identifying the universe or sampling frame based on the first Quarter of the most current ES-202
3. provide for mailing labels, mailing, and return mailing
4. receipt and first edit processing of schedules
5. ensure that the supplementary OES Project will be consistent with the National OES Program commitment, with priority being given to national commitments
6. assume full responsibility for processing of schedule data input to computer master files, if technically and economically feasible at a computer site provided by the State Board; direct and supervise manual processing provided by State Board if computer facilities are unavailable.
7. participate in training of interviewers, keypunch operators, and processing staff with BLS technical assistance
8. produce all State and area estimates
9. develop occupational projections in cooperation with the U. S. Department of Labor through the integrated national-state industry-occupational employment system
10. ensure that all sample establishments are informed of the cooperative participation of the State Board

B. State Board of Community Colleges and Occupational Education

1. provide salaries, travel, and per diem for their field staff for firm visits and follow-up in out-state areas
2. provide field interview monitoring and coordination of field work for central office processing, editing, and correction procedures with Division R and A staff
3. provide facilities and training site for their field staff involved in this project
4. arrange for and fund input and access computer facilities systems and programming services where required to process data for state and area estimates
5. provide funds for telephone service to BLS and other technical staff as required
6. participate in development of desired information output specifications
7. conduct conferences and workshops for users of information
8. utilize the Center for Vocational and Technical Education facilities for printing of necessary schedules for the manufacturing portion of the supplemental survey
9. have the Center contact BLS and other states to determine the best methods of advance publicity
10. coordinate through cooperative arrangement with the office of Education, HEW, and the Center the development of a system to automatically convert OES occupation codes to USOE Instructional Program codes
11. adapt area occupational projections after consultation with the Division and BLS for incorporation into the pilot Management Information System for Vocational Education and for use in State and Area Vocational Education Plans.

Project Plan and Responsibilities (continued)

12. provide other technical and supportive assistance pursuant to Occupational Education for development of the overall vocational educational system

Conclusions

- A. Data will be collected on the manufacturing sector of the economy for the State of Colorado that will be comparable to other data in the National OES Program and also provide a broader base on which to develop meaningful occupational information on additional areas.
- B. Permit an expanded sample to be developed on selected non-manufacturing industries and provide more reliable information to be developed than would otherwise be possible.
- C. Data developed from this project will be made available, through a joint Division and State Board arrangement, to other agencies and institutions to the extent resources permit and such other agencies and institutions honor generally accepted research practices and the confidentiality and disclosure requirements of Federal and State laws and regulations.
- D. Publication and release of any products from this project will conform to MA Field Memorandum 239-72, dated June 5, 1972, and will adhere to confidentiality and disclosure requirements of Federal and State laws and regulations.

DEFINITIONS

The following definitions are given for the purpose of this Agreement and are included as follows:

1. "Employing unit" (as defined in 82-1-3 (4) of Colorado Revised Statutes 1963 as amended) means any individual or type of organization, including any partnership, association, trust, estate, joint stock company, insurance company or corporation, whether domestic or foreign, or the receiver, trustee in bankruptcy, trustee or successor thereof, or the legal representative of a deceased person, which has in its employ one or more individuals performing services for it within this state. All individuals performing services within this state for any employing unit which maintains two or more separate establishments within this state shall be deemed to be employed by a single employing unit for all purposes of this chapter. Each individual employed to perform or to assist in performing the work of any agent or employee of an employing unit shall be deemed to be employed by such employing unit for all the purposes of this chapter, whether such individual was hired or paid directly by such employing unit or by such agent or employee, provided the employing unit had actual or constructive knowledge of the work.
2. "Establishment" is an economic unit which produces goods or services. It is usually at a single physical location and engaged in one or predominantly one type of industrial activity.
3. "Federal Installation"....In Government the term "Installation" generally is used in lieu of establishment and is so used here.

GENERAL PROCEDURES:

1. Sworn statements safeguarding the confidentiality of all data and information as defined by criteria in this Agreement will be required of all State Board employees, agents, licensees or sub-contractors assigned to work involving said data and information or having access to such. A copy of each said sworn person's signed statement shall reside in the respective joint project files of the Division and the State Board and be available for audit and verification.
2. Confidential materials may be in the form of schedules, forms, worksheets, listings, "IBM" cards or magnetic tapes and will require a receipt for transfer control. This dated receipt should describe the type of item; the number of pages, cards or tapes; and the identifying title, date, code, and label. A person authorized to perform the transfer will sign and a person authorized to receive the material will sign the receipt and each will keep a copy.
3. The Chief of Research and Analysis, Division of Employment, and the Director of Research Coordinating Unit for the State Board for Community Colleges and Occupational Education, are designated control and coordination points for project administration and for receipts of data and information. Any changes in these designations and/or responsibilities will be made in writing and appended to this agreement.
4. Care will be taken through sign-out procedures, by an appropriate person, that knowledge of the location of this confidential material and the responsible person in possession is continuously maintained.
5. Confidential materials transferred temporarily are not to be copied or reproduced and no duplicate magnetic tapes are to be made.
6. Processing of this confidential material should require only that the data format and specification be known. An exception would be when edit routines cause error printouts which require correction and then participation of specialists from the Division of Employment would have to be requested to fully verify, identify, and effect any correction to the original data.
7. Since this agreement involves maintaining a continuing flow of information, there should evolve a "best systems" design between the Divisions to minimize redundant processing of data for the necessary periodic updates.

WHO WILL CONDUCT THE SURVEY ?

- Research and Statistics Section of the Oregon State Employment Division.

HOW WILL THE SURVEY BE CONDUCTED ?

- personal interview
- mail-out questionnaire

WHY IS EMPLOYER COOPERATION NEEDED ?

- employer participation will determine the success of this program.

HOW WILL THE DATA BE PRESENTED ?

- narrative reports and tables

WHO WILL BE ABLE TO OBTAIN THIS INFORMATION ?

- interested public and private employers
- industrial groups
- planning groups
- educational institutions

WHO HAS ENDORSED THIS PROGRAM ?

The O.E.S. program is supported and endorsed by . . .

- TOM MCCALL - GOVERNOR OF OREGON
- ASSOCIATED OREGON INDUSTRIES
- EDUCATIONAL COORDINATING COUNCIL
- GOVERNOR'S ADVISORY COUNCIL FOR VOCATIONAL TRAINING
- GOVERNOR'S MANPOWER COORDINATING COMMITTEE
- OREGON AFL - CIO
- OREGON BOARD OF EDUCATION
- STATE APPRENTICESHIP AND TRAINING COUNCIL
- WESTERN WOOD PRODUCTS ASSOCIATION

• • • • •

FOR MORE INFORMATION CONCERNING THE OREGON OCCUPATIONAL EMPLOYMENT SURVEY

Contact the

EMPLOYMENT DIVISION
RESEARCH AND STATISTICS SECTION
402 Labor and Industries Building
Salem, Oregon 97310

Phone 378-3219

OR

YOUR LOCAL EMPLOYMENT OFFICE

About The **OREGON** OCCUPATIONAL EMPLOYMENT SURVEY...

•••••



... a biennial survey to estimate the number of workers in each occupation in each industry.

... to determine occupational needs for the use of

- EDUCATION
- EMPLOYERS
- INDUSTRY
- DEVELOPMENT GROUPS

STATE OF OREGON
EMPLOYMENT DIVISION
DEPARTMENT OF HUMAN RESOURCES
ROSS MORGAN, ADMINISTRATOR
402 LABOR AND INDUSTRIES BUILDING
SALEM, OREGON 97310
Survey conducted by

RESEARCH AND STATISTICS SECTION

APPENDIX B OREGON'S OES PAMPHLET

WHY THE SURVEY IS NECESSARY



A periodic survey of the State's occupational needs is necessary due to:

I. RAPID TECHNOLOGICAL CHANGE

The fast pace of technological and social change has resulted in rapid changes in requirements for many occupational skills.

II. INCREASING INDUSTRIAL COMPLEXITY

The growing complexity of industry which increases occupational specialization and requires more extensive special training or education.

III. VOCATIONAL PROGRAM NEEDS

The increasing governmental responsibility for vocational education and training which emphasizes needs for training, in order to allocate public funds.

IV. EDUCATIONAL PLANNING NEEDS

Educational planning based on hindsight or no planning at all, has resulted in shortages in some occupations and overtraining in some of the traditional vocational fields.

WHO WILL BENEFIT AND WHY

I. EDUCATIONAL PLANNERS BENEFIT

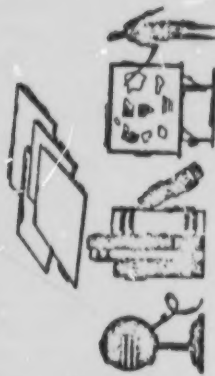
... they will have more accurate estimates to enable more precise and meaningful programs and curriculums. Educational decisions based on some assumptions about the future have to be made. Buildings must be built, laboratories and equipment purchased, and teachers trained. In the absence of systematic projections, past patterns of education are used for planning. In a rapidly changing society, the use of past patterns is often the wrong way. Projections based on current trends are a much better way of planning.

II. PRIVATE INDUSTRY EMPLOYERS BENEFIT

- they will be assured of adequate supplies of scientific and technical personnel.
- they will know that tax funds are being allocated more intelligently among alternative types of training.
- they will know where various manpower resources exist and they can plan accordingly.
- they will have more information to intelligently determine plant locations.
- they will know more precisely which in-plant training programs will be most beneficial to their particular industry or business.

III. INDIVIDUALS BENEFIT

- Occupational trends will be useful ...
- to help eliminate "wishful thinking" in career choices — wasted resources and years in obtaining education to qualify for disappearing occupations.
 - to enable "realistic" choices with higher success probabilities.
 - to enable MORE PEOPLE to enjoy the material and psychological benefits of meaningful employment.



IV. LOCAL, STATE AND NATIONAL GOVERNMENTS BENEFIT

- in fulfilling their responsibility to allocate public funds for education and vocational training programs wisely ... for maximum benefit at minimum cost.

APPENDIX C

SAMPLE OES QUESTIONNAIRE (Part I) (instructions have been deleted in this appendix) OES INDUSTRY LIST FOR MANUFACTURING (Part II)

Part I

BLS-MA 2677-328

U.S. DEPARTMENT OF LABOR

Bureau of Labor Statistics
and
The Manpower Administration
Washington, D.C. 20212

OMB Approval No. 44-571008
Approval expires June 1972

Report No. _____

**KEEP THIS COPY
FOR YOUR FILES**

Change address if incorrect.

**STONE PRODUCTS AND MISCELLANEOUS MINERAL
PRODUCTS Industries, 1971**

Report on Occupational Employment

*The Bureau of Labor Statistics,
the Manpower Administration,
and the State Agencies
cooperating in their statistical
programs will hold all information
furnished by the respondent in
strict confidence*

General Instructions

REPORTING UNIT: Complete this report for your company operation (Reporting Unit) identified on the above mailing label. To help multi-unit employers correctly identify the Reporting Unit, its physical location has been printed in the lower left portion of the label and our estimate of its total employment appears as a six digit number in the lower right corner of the label. (Multi-unit employers may receive questionnaire forms for more than one Reporting Unit).

REPORTING PERIOD: Report information for a payroll period that includes April 12, 1971. If, because of unusual operational problems (e.g., work stoppages, temporary shut-downs), the April 12 period is not a typical period, please report for a period nearest April 12 in which operations most closely approximate the normal.

PART I. GENERAL INFORMATION

1. TOTAL EMPLOYMENT _____ (9999)

Enter the total number of persons on the payroll covered by this report who worked full- or part-time or received pay for any part of the period reported. Include salaried officers of corporations and executives and their staffs, but exclude proprietors, members of unincorporated firms, and unpaid family workers. Include persons on vacations and sick leave for which they received pay directly from your firm for the period reported but exclude persons on leave without company pay the entire period and pensioners and members of the Armed Forces carried on the rolls but not working during the period reported.

2. NATURE OF BUSINESS

(a) Describe the principal activity and the major product or service of the Reporting Unit (e.g., Manufacturing—women's shoes; Warehousing—steel products; Research lab—radio and T.V. receiver; and Retail trade—shoe store).

(b) Is the Reporting Unit primarily engaged in performing services for other units of your company? Yes ☐ No ☐

If "yes" please check the one block below that best describes the service being performed.

- | | |
|--|--|
| (1) ☐ Central administrative office | (3) ☐ Storage (Warehouse) |
| (2) ☐ Research, development, or testing | (4) ☐ Other (Specify, e.g., powerplant) _____ |

3. STATUS OF ACTIVITY — Payroll period that includes April 12, 1971.

If the Reporting Unit did not operate under your management during the April 12 period, please check the appropriate block below:

- ☐ This unit has been sold or merged. New name and address is: _____
- ☐ This unit is out of business. _____
- ☐ Other (Describe) _____

4. If questions arise concerning your report, whom should we contact?

Mr. _____
Mrs. _____
Miss _____

Name	Title	City	State	Area Code	Tele. No.
------	-------	------	-------	-----------	-----------

PART II: EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Definition number (1)	Occupation (2)	Total (3)	Apprentice (4)	Office use only
SERVICE OCCUPATIONS				
	Include those workers in occupations concerned with the performance of services for persons that require either direct contact or close association with the individual; occupations concerned with the protection of individuals, or of public or private property; occupations concerned with preparing and serving food and beverages; and occupations related to the cleaning of the interior and equipment of buildings, offices, stores, and similar places.			
1	Foreman, Nonworking			1
2	Janitors, Porters, and Cleaners			2
3	Guards, Watchmen, and Doorkeepers (Gatemen; Etc.)			3
4	Food Service Workers (Cook; Cafeteria Worker; Waitress; Kitchen Worker; Etc.; <i>Exclude Cashiers</i>)			4
5	ALL OTHER Service Workers (Elevator Operators; Etc.)			5
MAINTENANCE, CONSTRUCTION, REPAIR, AND POWERPLANT OCCUPATIONS				
	Include all skilled, semiskilled, and unskilled workers performing machine and manual tasks involving maintenance, construction, repair, and powerplant operations. Include "apprentices" in the occupation to which they are apprenticed and report them in both columns (3) and (4).			
6	Foreman, Nonworking			6
7	Bricklayer (Kiln Repairman; Etc.)			7
8	Cupola Repairman			8
9	Loom Fixer (Fixer; Loom Repairman; Etc.)			9
10	Carpenter			10
11	Electrician			11
12	Instrument Repairman			12
13	Machinist, Maintenance			13
14	Mechanics and Repairmen (<i>Exclude Instrument Repairmen</i>)			
15	Mechanic, Automotive (Truck Mechanic; Auto Mechanic; Industrial Truck Mechanic; Etc.)			14
16	Mechanic, Maintenance			15
17	All Other Mechanics and Repairmen (Air Conditioning Repairman; Etc.)			16
18	Millwright			17
19	Sheet Metal Worker, Maintenance (Coppersmith; Tinsmith; Fabricator, Special Items; Roofer, Metal; Model Maker, Sheet Metal; Etc.)			18

GPO 740-131

PART II: EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Definition number (1)	Occupation (2)	Total (3)	Apprentice (4)	Office use only
	MAINTENANCE, CONSTRUCTION, REPAIR, AND POWERPLANT OCCUPATIONS-Continued			
20	Painter, Maintenance			19
21	Plumber and/or Pipefitter			20
22	Welders and Flamecutters, Maintenance			21
23	Maintenance Man, General Utility			22
24	Helper, Maintenance Trades			23
25	Stationary Engineer			24
26	Stationary Boiler Fireman			25
	ALL OTHER Maintenance, Construction, Repair, and Powerplant Workers			
27	All Other Skilled Craftsmen and Kindred Workers			26
28	All Other Operatives and Semiskilled Workers			27
29	All Other Laborers and Unskilled Workers (Oiler; Etc.)			28
	PRODUCTION (PLANT) OCCUPATIONS			
	Include all skilled, semiskilled, and unskilled workers performing machine or manual tasks involving production and/or material movement operations. Exclude plant clerical occupations.			
30	Foreman, Nonworking			29
31	Inspector (Mica Inspector; Gasket Inspector; Brake Lining Inspector; Grinding Wheel Inspector; Etc.)			30
32	Production Packager, Hand or Machine; Carton Forming Machine Operator; Etc.)			31
	GENERAL PRODUCTION OCCUPATIONS			
33	Kiln Operator (Kiln Burner; Lime Kiln Operator; Rotary Kiln Operator; Fireman, Kiln; Tunnel Kiln Operator; Drying Tunnel Man; Etc.)			32
34	Pressman (Auger Press Operator; Retort or Condenser Pressman; Dry Press Operator; Ram Press Operator; Silica Dry Press Operator; Etc.)			33
35	Screener Operator			34
36	Setter and/or Drawer (Kiln Setter; Kiln Placer; Kiln Drawer; Etc.)			35

PART II: EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Defin- tion number (1)	Occupation (2)	Total (3)	Office use only
	PRODUCTION (PLANT) OCCUPATIONS-Continued		
37	Sorter (Tile Sorter; Brick Sorter; Sewer Pipe Sorter; Etc.)		36
	CUT STONE AND STONE PRODUCTS OCCUPATIONS		
38	Beveler		37
39	Contour Grinder		38
40	Coper, Hand (Cutter; Marble Coper; Etc.)		39
41	Patternmaker		40
42	Planer, Stone (Planing Machine Operator; Etc.)		41
43	Sandblaster, Stone (Blastman; Rubber Cutter; Shape Carver; Etc.)		42
44	Sawyer (Circular Sawyer; Gang Sawyer; Ripsawyer; Wire Sawyer; Etc.)		43
45	Splitter (Rock Splitter; Splitter Operator; Slate Splitter; Splitting Machine Operator; Guillotine Cutter; Stone Splitter; Etc.)		44
46	Stencil Cutter		45
47	Stone Carver, Hand (Decorator; Hand Carver; Sculptor; Etc.)		46
48	Stone Cutter, Hand (Chisel Worker; Hand Cutter; Etc.)		47
49	Stone Cutter, Machine		48
50	Stone Driller		49
51	Stone Lathe Operator and/or Stone Lathe Polisher		50
52	Stone Molder (Molding Machine Operator; Molder; Etc.)		51
53	Stone Polisher (Stone Rubber; Stone Finisher; Etc.)		52
54	Stone Trimmer (Slate Trimmer; Etc.)		53
55	Tracer		54
	ABRASIVE PRODUCTS OCCUPATIONS		
56	Abrasive-Coating Machine Operator		55
57	Abrasive Grinder (Facing Grinder; Radius Grinder; Etc.)		56
58	Abrasive Mixer		57
59	Belt Maker		58
60	Bort Grinder (Diamond Dust Technician; Etc.)		59
61	Grinding Wheel Dresser		60
62	Hydraulic Press Operator (Hot Press Operator; Abrasive Wheel Molder; Etc.)		61
63	Lathe Operator (Finishing Machine Operator; Etc.)		62
64	Mixer, Diamond Powder		63

PART II: EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Definition number (1)	Occupation (2)	Total (3)	Office use only
	PRODUCTION (PLANT) OCCUPATIONS-Continued		
65	Polishing-Wheel Maker		64
66	Sizing-Machine Operator		65
67	Slitting-Machine Operator		66
68	Steel-Wool-Machine Operator, Automatic		67
	<i>ASBESTOS PRODUCTS, INSULATION AND GASKET, AND MINERAL WOOL OCCUPATIONS</i>		
69	Banbury Mixer Operator		68
70	Beam Warper Tender, Automatic		69
71	Braiding Machine Operator (Braider Tender; Braider Operator; Etc.)		70
72	Brake Lining Finisher, Asbestos		71
73	Calender Machine Operator (Cloth Calender; Tape Calender; Etc.)		72
74	Calender Operator, Insulation Board		73
75	Card Grinder (Card Fixer; Card Setter; Etc.)		74
76	Card Tender (Alley Tender; Card Feeder; Card Hand; Card Operator; Etc.)		75
77	Crusher Operator		76
78	Cupola Charger, Insulation		77
79	Cupola Operator		78
80	Cylinder-Machine Tender		79
81	Finisher, Card Tender		80
82	Gasket Coater and Drier Operator		81
83	Gasket Winder		82
84	Head Saw Operator, Insulation Board		83
85	Insulation Blanket Maker (Blanket Maker; Heat Retention Blanket Maker; Turbine Blanket Maker, Etc.)		84
86	Insulation Machine Operator (Pipecovering Builder; Etc.)		85
87	Mat-Machine Operator		86
88	Molder, Bench		87
89	Palletizer Tender		88
90	Preparation Room Worker (Blending-Machine Feeder; Duster Feeder; Hammer-Mill Picker Feeder; Stock Mixer; Etc.)		89
91	Rope Maker (Rope Operator; Etc.)		90

PART II: EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Definition number (1)	Occupation (2)	Total (3)	Office use only
	PRODUCTION (PLANT) OCCUPATIONS-Continued		
92	Sawyer, Tube		91
93	Sewer, Asbestos-Cloth		92
94	Spearmen (Wet Machine Operator; Etc.)		93
95	Spinner, Frame		94
96	Tenoner Operator		95
97	Tube Winder, Hand (Tube Maker; Winder Operator; Etc.)		96
98	Weaver (Loom Operator; Cloth Weaver; Tape Weaver; Etc.)		97
	<i>MINERALS, GROUND OR TREATED: NONCLAY REFRACTORIES: NON-METALLIC MINERAL PRODUCTS OCCUPATIONS</i>		
99	Brick-and-Tile-Making Machine Operator		98
100	Burner Man		99
101	Carbon-Arc-Furnace Operator		100
102	Caster		101
103	Cylinder Man		102
104	Filter Press Operator (Filterer; Filterman; Etc.)		103
105	Graphite-Pan-Drier Tender		104
106	Grinding Mill Operator		105
107	Mica Coater		106
108	Mica-Plate Layer		107
109	Mica Splitter		108
110	Mixer (Batch Mixer; Mixer Man; Etc.)		109
111	Molder, Hand		110
112	Mold Maker		111
113	Mosaic Worker		112
114	Press Operator, Mica		113
115	Rifter (Full Trimmer, Sheeter; Etc.)		114
	<i>MINING AND QUARRYING OCCUPATIONS</i>		
116	Blaster		115
117	Bulldozer Operator		116
118	Channeling Machine Operator (Channeling Machine Runner; Etc.)		117

PART II: EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Definition number (1)	Occupation (2)	Total (3)	Office use only
	PRODUCTION (PLANT) OCCUPATIONS—Continued		
119	Compressor Operator		118
120	Crusher Man		119
121	Driller, Machine		120
122	Power Shovel Operator (Back Hoe Operator; Etc.)		121
123	Quarryman		122
	MATERIAL HANDLING WORKERS		
124	Cranemen, Derrickmen, and Hoistmen (Electric-Monorail-Crane Operator; Electric-Bridge-or-Gantry-Crane Operator; Locomotive-Crane Operator; Tractor-Crane Operator; Truck-Crane Operator; Diesel, Electric, Compressed Air, Gasoline, or Steam Drum Operator; Etc.)		123
125	Industrial Truck Operator (Fork Lift Operator; Tow Motor Operator; Etc.)		124
126	Deliverymen and Routemen		125
127	Truck Driver		126
128	Order Filler		127
	ALL OTHER Production (Plant) Workers		
129	All Other Skilled Craftsmen and Kindred Workers		128
130	All Other Operatives and Semiskilled Workers		129
131	All Other Laborers and Unskilled Workers (Hand Trucker; Conveyor Loader; Etc.)		130

PART II: EMPLOYMENT BY OCCUPATION -- STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Definition number (1)	Occupation (2)	Total (3)	R & D (5)	Office only
	MANAGERS AND OFFICERS			
	Include persons concerned with managerial functions common to many types of organizations as well as occupations which require a knowledge of the management and operation of the given organization. Typical examples are: Corporate Officers; Plant Managers; Branch Managers; District Managers; Production Superintendents, and Managers of such departments as budget, purchasing, sales and distribution, advertising, public relations, personnel and training, etc. Those persons reported in column (5) should also be reported in column (3).			
132	Manager, Engineering			131
133	Manager, Scientific			132
134	All Other Managers and Officers			133
	PROFESSIONAL OCCUPATIONS, SCIENTIFIC			
	Include persons concerned with the theoretical or practical aspects of such fields as science, engineering, and technical work. Most of these occupations require substantial educational preparation, usually at the university level. Typical examples are: Architects; Engineers (including Sales Engineers); Chemists; Metallurgists; Physicists; Mathematicians; Statisticians; Biologists; Economists. Those persons reported in column (5) should also be reported in column (3).			
135	<i>Engineers (Include Sales Engineers)</i>			
136	Ceramic Engineer			134
137	Mining Engineer			135
138	Mechanical Engineer			136
139	Electrical and Electronic Engineers			137
140	Chemical Engineer			138
141	Industrial Engineer			139
142	Safety Engineer			140
143	Civil Engineer			141
144	All Other Engineers (Aeronautical; Marine; Nuclear; Etc.)			142
145	<i>Mathematical Scientists</i>			
146	Mathematician			143
147	Statistician			144
148	All Other Mathematical Scientists			145

PART II: EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Definition number (1)	Occupation (2)	Total (3)	R & D (5)	Office use only
	PROFESSIONAL OCCUPATIONS, SCIENTIFIC—Continued			
149	<i>Physical Scientists</i>			
150	Chemist			146
151	Physicist			147
152	All Other Physical Scientists (Geologist; Geophysicist; Oceanographer; Etc.)			148
	<i>Other Scientific Occupations</i>			
153	Life Scientists (Biological Scientists; Agricultural Scientist; Medical Scientist; Etc.; Exclude Medical Practitioners)			149
154	Social Scientist (Economist; Political Scientist; Psychologist; Sociologist; Etc.)			150
155	Systems Analyst, Electronic Data Processing			
156	Systems Analyst, Business			151
157	Systems Analyst, Scientific and Technical			152
158	All Other Professional Workers, Scientific (Architect; Etc.)			153
	PROFESSIONAL OCCUPATIONS, NONSCIENTIFIC			
	Include persons concerned with the theoretical or practical aspects of such fields as art, education, medicine, law, and business relations. Most of these occupations require substantial educational preparation, usually at the university level. Typical examples are: Accountants and Auditors; Purchasing Agents; Public Relations Men; Personnel and Training Specialists (other than departmental managers); Lawyers; Physicians and Surgeons, Registered Nurses; Editors and Writers.			
159	Accountants and Auditors			154
160	Purchasing Agent and/or Buyer			155
161	Lawyer			156
162	Personnel and Labor Relations Specialists (Utilization Officer; Job Analyst; Benefits-and-Service Records Supervisor; Position Classifier; Etc.)			157
163	Designer (Exclude Design Engineer)			158
164	All Other Professional Workers, Nonscientific (Professional Medical Practitioners; Photographer, Registered Nurse; Etc.)			159

PART II: EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Definition number (1)	Occupation (2)	Total (3)	R & D (5)	Office use only
	TECHNICIAN OCCUPATIONS			
	Include all persons actually engaged in technical work utilizing theoretical knowledge of fundamental scientific, engineering, mathematical, computer programming, or draft design principles, comparable to those acquired through study at technical institutes, junior colleges or other formal post high school training less extensive than a 4-year college course, or through equivalent on-the-job training or experience. Those persons reported in column (5) should also be reported in column (3).			
165	Computer Programmer			
166	Computer Programmer, Business			160
167	Computer Programmer, Scientific and Technical			161
168	Engineering Technicians			
169	Draftsman			162
170	Electrical and Electronic Technicians			163
171	All Other Engineering Technicians			164
172	Science Technician (Exclude Medical and Dental Technicians)			165
173	All Other Technicians (e.g., Quality Control Technicians, Medical and Dental Technicians)			166
	SALES OCCUPATIONS			
174	Salesmen (Exclude Sales Engineer)			167
175	Sales Clerks (Exclude Cashier)			168
	CLERICAL OCCUPATIONS			
	Include office and plant clerical personnel. Office clerical work involves preparing, transcribing, transferring, systematizing, and preserving communications and records; collating accounts and distributing information. Typical examples are: Secretaries; Stenographers; Typists; File Clerks; Office Machine Operator; Bookkeepers; Cashiers; Messengers; Telephone Operators; etc. Plant clerical work involves planning, coordinating, or expediting of production and the flow of work; or the clerical aspects of receiving, storing, issuing, or shipping of materials merchandise, supplies, or equipment.			
	OFFICE CLERICAL WORKERS			
176	Switchboard Operator			169
177	Receptionist			170
178	Switchboard Operator Receptionist			171

PART II: EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Defin- tion number (1)	Occupation (2)	Total (3)	Office use only
	CLERICAL OCCUPATIONS- Continued		
179	Secretary		172
180	Stenographer		173
181	Typist (Include Clerk-Typist)		174
182	File Clerk		175
183	General Clerk		176
184	Payroll and/or Timekeeping Clerks		177
185	Personnel Clerk		178
186	Procurement Clerk		179
187	Order Clerk (Mail Order Clerk; Telephone Order Clerk; Back Order Clerk; Etc.)		180
188	Bookkeeper, Hand		181
189	Accounting Clerk		182
190	Office Machine Operators		
191	Bookkeeping and Billing-Machine Operators		183
192	Computer Operator		184
193	Keypunch Operator		185
194	Peripheral EDP Equipment Operator		186
195	Tabulating-Machine Operator		187
196	All Other Office Machine Operator (Calculating Machine Operators; Duplicating Machine Operator; Sorting Machine Operators; Check-Writing-Machine Operators; Etc.)		188
197	All Other Office Clerical Workers (Messenger; Cashier; Etc.)		189
	Plant Clerical Workers		
198	Production Clerk and/or Coordinator		190
199	Shipping Packer (Freight Clerk; Reshipping Clerk; Etc.)		191
200	Shipping and/or Receiving Clerks		192
201	Stock Clerk (Storekeeper; Etc.)		193
202	All Other Plant Clerical Workers (Inventory Clerk; Tool Crib Attendant; Etc.)		194

PART II. EMPLOYMENT BY OCCUPATION - STONE PRODUCTS AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS Industries, 1971

Definition number (1)	Occupation (2)	Total (3)	Office use only
	CLERICAL OCCUPATIONS--Continued		
	TOTAL EMPLOYEES REPORTED IN COLUMN (3), PART II		(8888)

If you have properly reported all of your employees, the sum of column (3) entries will be approximately equal to the TOTAL EMPLOYMENT reported on page 1. If a comparison of the two figures reveals a significant difference, please re-check this report and make the necessary corrections.

COMMENTS

Report On Occupational Employment

Please complete this supplement to Part II and return it with your completed report. (Use the reverse of this page if additional space is required.)

IMPORTANT OCCUPATIONS REPORTED IN "ALL OTHER" CATEGORIES OF PART II

- A. Did you report workers in any "All Other" category of Part II who are in occupations that are numerically important in your operation or that require substantial training? Yes ☐ No ☐
- B. If "Yes," please use space below to identify each occupation. Enter job title(s), a short description of job duties, the number of workers you employ in the occupation(s) and the Definition Number of the Part II "All Other" category in which you reported these workers.

Job title and description of job duties	Number of workers employed	Definition No. of "All Other" category in which workers are reported
Sample Entry <i>Gear Cutter: Sets up and operates automatic gear cutting machine. Adjusts machine during operation to insure that finished work meets specification</i>	10	129

OFFICE USE ONLY	Schedule Number	Total Employment	SIC	Product .

APPENDIX C

Part II

List of Separate Industry Schedules Used in the 1971 Occupational Employment Survey of Manufacturing Establishments

<u>Standard Industrial Classification (SIC) Code</u>	<u>Industry Title</u>
201	Meat Products
202	Dairy Products
203	Canned, Cured, and Frozen Foods
205	Bakery Products
208	Beverages
204, 6, 7 & 9	Grain Mill Products; Sugar; Confectionary and Related Products; and Misc. Foods and Kindred Products
21	Tobacco Manufacturers
22	Textile Mill Products
23	Apparel and Other Textile Products
24	Lumber and Wood Products
25	Furniture and Fixtures
261, 2, 3, & 6	Pulp Mills; Paper Mills, Except Building Paper; Paperboard Mills; and Building Paper and Board Mills
264, 5	Misc. Converted Paper Products; and Paperboard Containers and Boxes
281	Industrial Chemicals
282	Plastics Materials and Synthetics

<u>SIC Code</u>	<u>Industry Title</u>
283	Drugs
284	Soap, Cleaners, and Toilet Goods
285-7, & 9	Paints and Allied Products; Gum and Wood Chemicals; Agricultural Chemicals; and Miscellaneous Chemical Products
29	Petroleum and Coal Products
301-6	Tires and Inner Tubes; Rubber Footwear; Reclaimed Rubber; and Fabricated Rubber Products, nec
307	Miscellaneous Plastic Products
311, 2, 5, 6, 7, & 9	Leather Tanning and Finishing; Industrial Leather Belting; Leather Gloves and Mittens; Luggage; Handbags and Personal Leather Goods; Leather Goods, nec
313, 4	Footwear Cut Stock; Footwear, Except Rubber
321, 2, & 3	Flat-Glass; Glass and Glassware, Pressed or Blown; and Products of Purchased Glass
324-7	Cement, Hydraulic; Structural Clay Products; Pottery and Related Products; and Concrete, Gypsum, and Plaster Products
328, 9	Cut Stone and Stone Products; and Misc. Nonmetallic Mineral Products
331	Blast Furnace and Basic Steel Products
332, 6	Iron and Steel and Nonferrous Foundries
333, 4	Primary Nonferrous Metals; Secondary Nonferrous Metals
335, 9	Nonferrous Rolling and Drawing; and Miscellaneous Primary Metal Products
391	Jewelry, Silverware, and Plated Ware
393, 4, 5, 6, & 9	Musical Instruments and Parts; Toys and Sporting Goods; Pens, Pencils, Office and Art Supplies; Costume Jewelry and Notions; and Miscellaneous Manufacturers

SIC Code

Industry Title

19 & 34
through 38

Metalworking

GPO 916.000

69/70

2

APPENDIX D

1970 CENSUS LIST OF 440 OCCUPATIONAL CLASSIFICATION CATEGORIES

- 001 Accountants (001)
- 002 Architects (002)
- 003 Computer programmers (003)
- 004 Computer systems analysts (004)
- 005 Computer specialists, n.e.c. (005)
- 006 Aeronautical and astronautical engineers (006)
- 007 Chemical engineers (010)
- 008 Civil engineers (011)
- 009 Electrical and electronic engineers (012)
- 010 Industrial engineers (013)
- 011 Mechanical engineers (014)
- 012 Metallurgical and materials engineers (015)
- 013 Mining engineers (020)
- 014 Petroleum engineers (021)
- 015 Sales engineers (022)
- 016 Engineers, n.e.c. (023)
- 017 Farm management advisors (024)
- 018 Foresters and conservationists (025)
- 019 Home management advisors (026)
- 020 Judges (030)
- 021 Lawyers (031)
- 022 Librarians (032)
- 023 Archivists and curators (033)
- 024 Actuaries (034)
- 025 Mathematicians (035)
- 026 Statisticians (036)
- 027 Agricultural scientists (042)
- 028 Atmospheric and space scientists (043)
- 029 Biological scientists (044)
- 030 Chemists (045)
- 031 Geologists (051)
- 032 Marine scientists (052)
- 033 Physicists and astronomers (053)
- 034 Life and physical scientists, n.e.c. (054)
- 035 Operations and systems researchers and analysts (055)
- 036 Personnel and labor relations workers (056)
- 037 Chiropractors (061)
- 038 Dentists (062)
- 039 Optometrists (063)

- 040 Pharmacists (064)
- 041 Physicians, medical and osteopathic (065)
- 042 Podiatrists (071)
- 043 Veterinarians (072)
- 044 Health practitioners, n.e.c. (073)
- 045 Dietitians (074)
- 046 Registered nurses (075)
- 047 Therapists (076)
- 048 Clinical laboratory technologists and technicians (080)
- 049 Dental hygienists (081)
- 050 Health record technologists and technicians (082)
- 051 Radiologic technologists and technicians (083)
- 052 Therapy assistants (084)
- 053 Health technologists and technicians, n.e.c. (085)
- 054 Clergymen (086)
- 055 Religious workers, n.e.c. (090)
- 056 Economists (091)
- 057 Political scientists (092)
- 058 Psychologists (093)
- 059 Sociologists (094)
- 060 Urban and regional planners (095)
- 061 Social scientists, n.e.c. (096)
- 062 Social workers (100)
- 063 Recreation workers (101)
- 064 Agriculture teachers (102)
- 065 Atmospheric, earth, marine, and space teachers (103)
- 066 Biology teachers (104)
- 067 Chemistry teachers (105)
- 068 Physics teachers (110)
- 069 Engineering teachers (111)
- 070 Mathematics teachers (112)
- 071 Health specialties teachers (113)
- 072 Psychology teachers (114)
- 073 Business and commerce teachers (115)
- 074 Economics teachers (116)
- 075 History teachers (120)
- 076 Sociology teachers (121)
- 077 Social science teachers, n.e.c. (122)
- 078 Art, drama, and music teachers (123)
- 079 Coaches and physical education teachers (124)
- 080 Education teachers (125)
- 081 English teachers (126)
- 082 Foreign language teachers (130)
- 083 Home economics teachers (131)

- 084 Law teachers (132)
- 085 Theology teachers (133)
- 086 Trade, industrial, and technical teachers (134)
- 087 Miscellaneous teachers, college and university (135)
- 088 Teachers, college and university, subject not specified (140)
- 089 Adult education teachers (141)
- 090 Elementary school teachers (142)
- 091 Prekindergarten and kindergarten teachers (143)
- 092 Secondary school teachers (144)
- 093 Teachers, except college and university, n.e.c. (145)
- 094 Agriculture and biological technicians, except health (150)
- 095 Chemical technicians (151)
- 096 Draftsmen (152)
- 097 Electrical and electronic engineering technicians (153)
- 098 Industrial engineering technicians (154)
- 099 Mechanical engineering technicians (155)
- 100 Mathematical technicians (156)
- 101 Surveyors (161)
- 102 Engineering and science technicians, n.e.c. (162)
- 103 Airplane pilots (163)
- 104 Air traffic controllers (164)
- 105 Embalmers (165)
- 106 Flight engineers (170)
- 107 Radio operators (171)
- 108 Tool programmers, numerical control (172)
- 109 Technicians, n.e.c. (173)
- 110 Vocational and educational counselors (174)
- 111 Actors (175)
- 112 Athletes and kindred workers (180)
- 113 Authors (181)
- 114 Dancers (182)
- 115 Designers (183)
- 116 Editors and reporters (184)
- 117 Musicians and composers (185)
- 118 Painters and sculptors (190)
- 119 Photographers (191)
- 120 Public relations men and publicity writers (192)
- 121 Radio and television announcers (193)
- 122 Writers, artists, and entertainers, n.e.c. (194)
- 123 Research workers, not specified (195)
- 124 Professional, technical, and kindred workers—allocated (196)
- 125 Assessors, controllers, and treasurers; local public administration (201)
- 126 Bank officers and financial managers (202)
- 127 Buyers and shippers, farm products (203)

- 128 Buyers, wholesale and retail trade (205)
- 129 Credit men (210)
- 130 Funeral directors (211)
- 131 Health administrators (212)
- 132 Construction inspectors; public administration (213)
- 133 Inspectors, except construction; public administration (215)
- 134 Managers and superintendents, building (216)
- 135 Office managers, n.e.c. (220)
- 136 Officers, pilots, and pursers; ship (221)
- 137 Officials and administrators; public administration, n.e.c. (222)
- 138 Officials of lodges, societies, and unions (223)
- 139 Postmasters and mail superintendents (224)
- 140 Purchasing agents and buyers, n.e.c. (225)
- 141 Railroad conductors (226)
- 142 Restaurant, cafeteria, and bar managers (230)
- 143 Sales managers and department heads, retail trade (231)
- 144 Sales managers, except retail trade (233)
- 145 School administrators, college (235)
- 146 School administrators, elementary and secondary (240)
- 147 Managers and administrators, n.e.c. (245)
- 148 Managers and administrators, except farm—allocated (246)
- 149 Advertising agents and salesmen (260)
- 150 Auctioneers (261)
- 151 Demonstrators (262)
- 152 Hucksters and peddlers (264)
- 153 Insurance agents, brokers, and underwriters (265)
- 154 Newsboys (266)
- 155 Real estate agents and brokers (270)
- 156 Stock and bond salesmen (271)
- 157 Sales representatives, manufacturing industries (281)
- 158 Sales representatives, wholesale trade (282)
- 159 Sales clerks, retail trade (283)
- 160 Salesmen, retail trade (284)
- 161 Salesmen of services and construction (285)
- 162 Sales workers—allocated (296)
- 163 Bank tellers (301)
- 164 Billing clerks (303)
- 165 Bookkeepers (305)
- 166 Cashiers (310)
- 167 Clerical assistants, social welfare (311)
- 168 Clerical supervisors, n.e.c. (312)
- 169 Collectors, bill and account (313)
- 170 Counter clerks, except food (314)
- 171 Dispatchers and starters, vehicle (315)

- 172 Enumerators and interviewers (320)
- 173 Estimators and investigators, n.e.c. (321)
- 174 Expeditors and production controllers (323)
- 175 File clerks (325)
- 176 Insurance adjusters, examiners, and investigators (326)
- 177 Library attendants and assistants (330)
- 178 Mail carriers, post office (331)
- 179 Mail handlers, except post office (332)
- 180 Messengers and office boys (333)
- 181 Meter readers, utilities (334)
- 182 Bookkeeping and billing machine operators (341)
- 183 Calculating machine operators (342)
- 184 Computer and peripheral equipment operators (343)
- 185 Duplicating machine operators (344)
- 186 Key punch operators (345)
- 187 Tabulating machine operators (350)
- 188 Office machine operators, n.e.c. (355)
- 189 Payroll and timekeeping clerks (360)
- 190 Postal clerks (361)
- 191 Proofreaders (362)
- 192 Real estate appraisers (363)
- 193 Receptionists (364)
- 194 Secretaries, legal (370)
- 195 Secretaries, medical (371)
- 196 Secretaries, n.e.c. (372)
- 197 Shipping and receiving clerks (374)
- 198 Statistical clerks (375)
- 199 Stenographers (376)
- 200 Stock clerks and storekeepers (381)
- 201 Teacher aides, except school monitors (382)
- 202 Telegraph messengers (383)
- 203 Telegraph operators (384)
- 204 Telephone operators (385)
- 205 Ticket, station, and express agents (390)
- 206 Typists (391)
- 207 Weighers (392)
- 208 Miscellaneous clerical workers (394)
- 209 Not specified clerical workers (395)
- 210 Clerical and kindred workers—allocated (396)
- 211 Automobile accessories installers (401)
- 212 Bakers (402)
- 213 Blacksmiths (403)
- 214 Boilermakers (404)
- 215 Bookbinders (405)

- 216 Brickmasons and stonemasons (410)
- 217 Brickmason and stonemason apprentices (411)
- 218 Bulldozer operators (412)
- 219 Cabinetmakers (413)
- 220 Carpenters (415)
- 221 Carpenter apprentices (416)
- 222 Carpet installers (420)
- 223 Cement and concrete finishers (421)
- 224 Compositors and typesetters (422)
- 225 Printing trades apprentices, except pressmen (423)
- 226 Cranemen, derrickmen, and hoistmen (424)
- 227 Decorators and window dressers (425)
- 228 Dental laboratory technicians (426)
- 229 Electricians (430)
- 230 Electrician apprentices (431)
- 231 Electric power linemen and cablemen (433)
- 232 Electrotypers and stereotypers (434)
- 233 Engravers, except photoengravers (435)
- 234 Excavating, grading, and road machine operators; except bulldozer (436)
- 235 Floor layers, except tile setters (440)
- 236 Foremen, n.e.c. (441)
- 237 Forgemen and hammermen (442)
- 238 Furniture and wood finishers (443)
- 239 Furriers (444)
- 240 Glaziers (445)
- 241 Heat treaters, annealers, and temperers (446)
- 242 Inspectors, scalers, and graders; log and lumber (450)
- 243 Inspectors, n.e.c. (452)
- 244 Jewelers and watchmakers (453)
- 245 Job and die setters, metal (454)
- 246 Locomotive engineers (455)
- 247 Locomotive firemen (456)
- 248 Machinists (461)
- 249 Machinist apprentices (462)
- 250 Air conditioning, heating, and refrigeration (470)
- 251 Aircraft (471)
- 252 Automobile body repairmen (472)
- 253 Automobile mechanics (473)
- 254 Automobile mechanic apprentices (474)
- 255 Data processing machine repairmen (475)
- 256 Farm implement (480)
- 257 Heavy equipment mechanics, including diesel (481)
- 258 Household appliance and accessory installers and mechanics (482)
- 259 Loom fixers (483)

- 260 Office machine (484)
- 261 Radio and television (485)
- 262 Railroad and car shop (486)
- 263 Mechanic, except auto, apprentices (491)
- 264 Miscellaneous mechanics and repairmen (492)
- 265 Not specified mechanics and repairmen (495)
- 266 Millers; grain, flour, and feed (501)
- 267 Millwrights (502)
- 268 Molders, metal (503)
- 269 Molder apprentices (504)
- 270 Motion picture projectionists (505)
- 271 Opticians, and lens grinders and polishers (506)
- 272 Painters, construction and maintenance (510)
- 273 Painter apprentices (511)
- 274 Paperhangers (512)
- 275 Pattern and model makers, except paper (514)
- 276 Photoengravers and lithographers (515)
- 277 Piano and organ tuners and repairmen (516)
- 278 Plasterers (520)
- 279 Plasterer apprentices (521)
- 280 Plumbers and pipe fitters (522)
- 281 Plumber and pipe fitter apprentices (523)
- 282 Power station operators (525)
- 283 Pressmen and plate printers, printing (530)
- 284 Pressman apprentices (531)
- 285 Rollers and finishers, metal (533)
- 286 Roofers and slaters (534)
- 287 Sheetmetal workers and tinsmiths (535)
- 288 Sheetmetal apprentices (536)
- 289 Shipfitters (540)
- 290 Shoe repairmen (542)
- 291 Sign painters and letterers (543)
- 292 Stationary engineers (545)
- 293 Stone cutters and stone carvers (546)
- 294 Structural metal craftsmen (550)
- 295 Tailors (551)
- 296 Telephone installers and repairmen (552)
- 297 Telephone linemen and splicers (554)
- 298 Tile setters (560)
- 299 Tool and die makers (561)
- 300 Tool and die maker apprentices (562)
- 301 Upholsterers (563)
- 302 Specified craft apprentices, n.e.c. (571)
- 303 Not specified apprentices (572)

- 304 Craftsmen and kindred workers, n.e.c. (575)
- 305 Former members of the Armed Forces (580)
- 306 Craftsmen and kindred workers—allocated (586)
- 307 Asbestos and insulation workers (601)
- 308 Assemblers (602)
- 309 Blasters and powdermen (603)
- 310 Bottling and canning operatives (604)
- 311 Chainmen, rodmen, and axmen; surveying (605)
- 312 Checkers, examiners, and inspectors; manufacturing (610)
- 313 Clothing ironers and pressers (611)
- 314 Cutting operatives, n.e.c. (612)
- 315 Dressmakers and seamstresses, except factory (613)
- 316 Drillers, earth (614)
- 317 Dry wall installers and lathers (615)
- 318 Dyers (620)
- 319 Filers, polishers, sanders, and buffers (621)
- 320 Furnacemen, smeltermen, and pourers (622)
- 321 Garage workers and gas station attendants (623)
- 322 Graders and sorters, manufacturing (624)
- 323 Produce graders and packers, except factory and farm (625)
- 324 Heaters, metal (626)
- 325 Laundry and dry cleaning operatives, n.e.c. (630)
- 326 Meat cutters and butchers, except manufacturing (631)
- 327 Meat cutters and butchers, manufacturing (633)
- 328 Meat wrappers, retail trade (634)
- 329 Metal platers (635)
- 330 Milliners (636)
- 331 Mine operatives, n.e.c. (640)
- 332 Mixing operatives (641)
- 333 Oilers and greasers, except auto (642)
- 334 Packers and wrappers, except meat and produce (643)
- 335 Painters, manufactured articles (644)
- 336 Photographic process workers (645)
- 337 Drill press operatives (650)
- 338 Grinding machine operatives (651)
- 339 Lathe and milling machine operatives (652)
- 340 Precision machine operatives, n.e.c. (653)
- 341 Punch and stamping press operatives (656)
- 342 Riveters and fasteners (660)
- 343 Sailors and deckhands (661)
- 344 Sawyers (662)
- 345 Sewers and stitchers (663)
- 346 Shoemaking machine operatives (664)
- 347 Solderers (665)

- 348 Stationary firemen (666)
- 349 Carding, lapping, and combing operatives (670)
- 350 Knitters, loopers, and toppers (671)
- 351 Spinners, twistors, and winders (672)
- 352 Weavers (673)
- 353 Textile operatives, n.e.c. (674)
- 354 Welders and flame-cutters (680)
- 355 Winding operatives, n.e.c. (681)
- 356 Machine operatives, miscellaneous specified (690)
- 357 Machine operatives, not specified (692)
- 358 Miscellaneous operatives (694)
- 359 Not specified operatives (695)
- 360 Operatives, except transport—allocated (696)
- 361 Boatmen and canalmen (701)
- 362 Bus drivers (703)
- 363 Conductors and motormen, urban rail transit (704)
- 364 Deliverymen and routemen (705)
- 365 Fork lift and tow motor operatives (706)
- 366 Motormen; mine, factory, logging camp, etc. (710)
- 367 Parking attendants (711)
- 368 Railroad brakemen (712)
- 369 Railroad switchmen (713)
- 370 Taxicab drivers and chauffeurs (714)
- 371 Truck drivers (715)
- 372 Transport equipment operatives—allocated (726)
- 373 Animal caretakers, except farm (740)
- 374 Carpenters' helpers (750)
- 375 Construction laborers, except carpenters' helpers (751)
- 376 Fishermen and oystermen (752)
- 377 Freight and material handlers (753)
- 378 Garbage collectors (754)
- 379 Gardeners and groundskeepers, except farm (755)
- 380 Longshoremen and stevedores (760)
- 381 Lumbermen, raftsmen, and woodchoppers (761)
- 382 Stock handlers (762)
- 383 Teamsters (763)
- 384 Vehicle washers and equipment cleaners (764)
- 385 Warehousemen, n.e.c. (770)
- 386 Miscellaneous laborers (780)
- 387 Not specified laborers (785)
- 388 Laborers, except farm—allocated (796)
- 389 Farmers (owners and tenants) (801)
- 390 Farm managers (802)
- 391 Farmers and farm managers—allocated (806)

- 392 Farm foremen (821)
- 393 Farm laborers, wage workers (822)
- 394 Farm laborers, unpaid family workers (823)
- 395 Farm service laborers, self-employed (824)
- 396 Farm laborers and farm foremen—allocated (846)
- 397 Chambermaids and maids, except private household (901)
- 398 Cleaners and charwomen (902)
- 399 Janitors and sextons (903)
- 400 Bartenders (910)
- 401 Busboys (911)
- 402 Cooks, except private household (912)
- 403 Dishwashers (913)
- 404 Food counter and fountain workers (914)
- 405 Waiters (915)
- 406 Food service workers, n.e.c., except private household (916)
- 407 Dental assistants (921)
- 408 Health aides, except nursing (922)
- 409 Health trainee (923)
- 410 Lay midwives (924)
- 411 Nursing aides, orderlies, and attendants (925)
- 412 Practical nurses (926)
- 413 Airline stewardesses (931)
- 414 Attendants, recreation and amusement (932)
- 415 Attendants, personal service, n.e.c. (933)
- 416 Baggage porters and bellhops (934)
- 417 Barbers (935)
- 418 Boarding and lodging housekeepers (940)
- 419 Bootblacks (941)
- 420 Child care workers, except private household (942)
- 421 Elevator operators (943)
- 422 Hairdressers and cosmetologists (944)
- 423 Personal service apprentices (945)
- 424 Housekeepers, except private household (950)
- 425 School monitors (952)
- 426 Ushers, recreation and amusement (953)
- 427 Welfare service aides (954)
- 428 Crossing guards and bridge tenders (960)
- 429 Firemen, fire protection (961)
- 430 Guards and watchmen (962)
- 431 Marshals and constables (963)
- 432 Policemen and detectives (964)
- 433 Sheriffs and bailiffs (965)
- 434 Service workers, except private household—allocated (976)
- 435 Child care workers, private household (980)

- 436 Cooks, private household (981)
- 437 Housekeepers, private household (982)
- 438 Laundresses, private household (983)
- 439 Maids and servants, private household (984)
- 440 Private household workers—allocated (986)

NOTE: The code to the right of the category represents the occupation code defined by the 1970 Census of Population *Alphabetical Index of Industries and Occupations*.

The 440 occupation groups appear in the logical record in the order which they are listed above.

Source: BLS Regional Conference on its National State Matrix System, Houston, Texas, December 12 and 13, 1972.

APPENDIX E

THE DATA PROBLEM VERSUS OTHER PROBLEMS IN STATE AND LOCAL MANPOWER PLANNING*

William R. Bechtel, Executive Director
Wisconsin State Manpower Council

I think it is perfectly clear to anyone who spends one hour in the task of manpower planning at the state and local level that the inadequacy of data and labor market information is a serious impediment to doing the job. However, I think it is only fair to consider the relative seriousness of that problem. That is to say, how serious is the lack of data at the state and local level compared with some of the other problems we face?

My answer is that the lack of data is a minor problem compared with some of the larger problems which we face in manpower planning, and that furthermore, the minor problem will never be solved unless the larger problem is solved.

The point I want to develop is this:

The gathering of adequate data is a complex and costly process that involves a high commitment of resources and the dedicated participation of a major number of government agencies. We will never mobilize these resources and this dedication unless the Administration, the Congress and the public really understand the crisis of poverty and unemployment in this country, and the need to attack it boldly at the state and local level. We will never get those resources and that degree of dedication as long as the state and local manpower planning process is not taken seriously by the very federal agencies that have established it.

It is my opinion that if the Congress and the public were fully aware of the manpower crisis in the United States, the machinery would be speedily set up to provide us with the data we need—along with many other things that we need. But the public and the Congress have not been told the full story.

Within the Bureau of Labor Statistics there are sixty-eight volumes of data gathered at great expense in connection with the 1970 census, in the deeply troubled inner cores of fifty-one American cities. This detailed study of inner-city neighborhoods was initiated, at least in part, by the Bureau of Labor Statistics in 1967 under Secretary of Labor Willard Wirtz and programmed into the Urban Employment Survey questionnaire.

*An excerpt from "Area Data From a State Point of View," presented at the USDL, BLS, Selected Papers from North American Conference on Labor Statistics, June 26-29, 1972, Denver, Colorado (Washington, D.C.: USGPO; 1972), pp. 158-60.

The purpose of this survey was to get a real measure of the manpower crisis in our cities. It is helpful to know how many people are unemployed (and it is hard to believe that there was a time not too long ago when we didn't even know that much about our society). But today we are much more sophisticated and much more aware of the manpower crisis, and we know that a statistic on unemployment alone does not tell us very much. We also need to know how many of those who are employed are still facing problems almost as serious as those who are unemployed.

How many are working only part-time while seeking full-time jobs? How many are discouraged workers, who have simply stopped pounding the pavement because they have become convinced there are no jobs for them? How many are working full-time and still earning less than the extremely rigid poverty income level set by the federal government?

The sixty-eight volumes of information gathering dust on shelves of the Labor Department tell a shocking story of the real manpower crisis within our cities.

At a time when the Secretary of Labor and the President of the United States were reassuring the nation on television that the unemployment rate for adult males was only 4 percent, in an obvious effort to minimize the unemployment problem, the census employment survey held hidden facts such as these:

In Los Angeles, an official unemployment rate of 7.2 percent, an inner-city unemployment rate of 12.5 percent, and a "subemployment index" of 33 percent—1/3 of its work force either unemployed, discouraged from seeking jobs, working but earning less than poverty wages, or working part-time when a full-time job was needed.

Similarly, in Detroit, where the official rate was 7 percent, the inner-city rate was 14 percent and the subemployment index was almost 35 percent. In Minneapolis a 3.8 percent unemployment rate concealed a 9 percent rate in the inner-city and a subemployment index of over 37 percent. In Memphis an unemployment rate of 3.9 percent concealed an inner-city rate of 11.3 percent and a subemployment index of 44 percent. The story was very similar all across the nation. The fifty-one cities had an average unemployment rate in their inner-city neighborhood of 9.6 percent and more than 30 percent were in the group covered by the subemployment index.

These are shocking facts. They certainly are facts that anyone should have before he began designing manpower programs for these communities. I know there are shortcomings in this information. No single set of statistics tells the whole story but . . . This provides information vital to the development of manpower policy.

Let me give you one example—the Secretary of Labor, and the Secretary of Health, Education and Welfare have announced that the WIN program for welfare recipients, toughened up by the recent Talmadge Amendments, is to be the number one manpower program in this Administration. The goal of that program is to take welfare recipients and place them in regular jobs, involuntarily if necessary.

APPENDIX F

MASTER TABLE: AVERAGE EMPLOYMENT, ALL OCCUPATIONS, COLORADO 1970-1975
FROM THE INTERIM REPORT: OCCUPATIONAL OUTLOOK FOR COLORADO, 1970-1975

OCCUPATION	1970 EMPLOYMENT	1975 EMPLOYMENT 1/	1970-1975 JOB OPENINGS DUE TO:		1970-1975 TOTAL JOBS DUE TO REPLACEMENT & EMPLOY. CHANGE
			Replacement Needs	Change in Employ. Level	
PROFESSIONAL, TECH, KINDRED	126,100 2/	152,420	23,180	26,310	49,490
Engineers, Technical	9,910	11,230	870	1,320	2,190
Engineers, Aeronautical	430	580	20	150	170
Engineers, Chemical	290	330	20	30	50
Engineers, Civil	2,370	2,490	280	120	400
Engineers, Electrical	1,950	2,270	130	320	450
Engineers, Industrial	870	1,110	80	250	330
Engineers, Mechanical	1,630	1,800	140	170	310
Engineers, Metallurgical	220	240	20	20	40
Engineers, Mining	320	360	30	40	70
Other Engineers, Tech.	1,840	2,060	150	210	360
Medical & Other Health Wkr.	22,280	27,130	5,650	4,850	10,500
Dentists	850	990	140	140	280
Dietitians & Nutritionists	400	450	110	50	160
Nurses, Professional	9,310	11,660	2,890	2,350	5,240
Optometrists	160	170	20	10	30
Osteopaths	120	150	20	30	50
Pharmacists	1,620	1,510	280	-110	170
Physicians & Surgeons	2,680	3,330	470	640	1,110
Psychologists	420	540	10	120	130
Tech, Medical & Dental	3,420	4,860	940	1,440	2,380
Veterinarians	300	440	50	90	140
Other Medical & Health Wkr.	2,910	3,040	720	100	820
Teachers	34,670	37,250	7,140	2,580	9,720
Teachers, Elementary	14,160	14,560	3,620	390	4,010
Teachers, Secondary	11,420	12,080	1,970	670	2,640
Teachers, College	6,200	7,120	920	920	1,840
Teachers, Other	2,890	3,490	630	600	1,230
Natural Scientists	3,790	4,600	370	810	1,180
Chemists	810	1,040	70	230	300
Agricultural Scientists	580	660	50	80	130
Biological Scientists	610	740	90	130	220
Geologists & Geophysicists	490	540	30	50	80

OCCUPATION	1970 EMPLOYMENT	1975 EMPLOYMENT	1970-1975 JOB OPENINGS DUE TO:		1970-1975 TOTAL JOBS DUE TO REPLACEMENT & EMPLOY. CHANGE
			Replacement Needs	Change in Employ. Level	
Natural Scientists (cont.)					
Mathematicians	430	530	50	90	140
Physicists	350	460	40	110	150
Other Natural Scientists	530	640	50	110	160
Social Scientists	770	940	140	170	310
Economists	290	360	50	70	120
Statisticians & Actuaries	350	420	60	70	130
Other Social Scientists	130	160	30	30	60
Tech, Exc. Medical & Dental	10,420	11,780	810	1,360	2,190
Draftsmen	3,070	3,140	210	70	280
Surveyors	710	690	60	-30	30
Air Traffic Controllers	370	460	20	90	110
Radio Operators	360	440	20	80	100
Technicians, Other	5,910	7,070	510	1,170	1,680
Other Prof. Technical, Kindred	44,260	59,470	8,790	15,200	23,990
Accountants & Auditors	6,430	7,960	1,040	1,530	2,570
Airplane Pilots & Navigtrs.	1,070	1,360	100	290	390
Architects	460	390	30	-60	-30
Clergymen	2,200	2,340	380	150	530
Designers, Exc. Design. Draftsmn.	730	840	90	110	200
Editors & Reporters	1,030	1,160	220	130	350
Lawyers & Judges	2,880	5,610	690	2,730	3,420
Librarians	1,440	1,730	450	290	740
Personnel & Lbr. Relations	2,080	2,840	330	760	1,090
Photographers	690	730	90	40	130
Social & Welfare Workers	3,080	3,930	780	860	1,640
Teachers, Wkrs. in Arts, Entrmnt.	8,400	9,310	1,380	910	2,290
Prof., Technical, Kindred Med.	13,700	21,260	2,630	7,480	10,110
MANAGERS, OFFICIALS, PROPRITRS.	97,810	109,430	15,560	11,620	27,180
Conductors, Railroad	450	530	110	80	190
Officers, Pilots, Enginrs Ship	110	120	10	0	10
Creditmen	720	910	120	200	320
Purchasing Agents	1,560	1,710	200	140	340
Postmasters & Assistants	380	400	100	20	120
Mgrs., Officials, Prop. Mec	94,590	105,760	15,030	11,170	26,200

OCCUPATION	1970 EMPLOYMENT	1975 EMPLOYMENT 1/	1970-1975 JOB OPENINGS DUE TO:		1970-1975 TOTAL JOBS DUE TO REPLACEMENT & EMPLOY. CHANGE
			Replacement Needs	Change in Employ. Level	
CLERICAL & KINDRED WORKERS	156,830	184,100	40,620	27,270	67,390
Stenographers, Typists, Secys	39,930	46,440	13,260	8,510	21,770
Office Machine Operators	6,370	8,270	1,850	1,900	3,750
Other Clerical & Kindred	110,530	127,380	25,520	16,860	42,380
Accounting Clerks	5,630	6,230	1,250	600	1,850
Bookkeepers, Hand	10,100	10,520	2,590	830	3,420
Bank Tellers	2,620	3,370	630	750	1,380
Cashiers	9,840	12,220	2,580	2,390	4,970
Mail Carriers	2,740	3,240	310	500	810
Postal Clerks	3,240	3,840	430	610	1,040
Shipping & Receiving Clerks	3,150	3,470	340	320	660
Telephone Operators	5,290	5,590	1,590	210	1,800
Clerical & Kindred Nec.	67,930	78,600	15,830	10,670	26,500
SALES WORKERS	52,590	60,800	10,550	8,210	18,750
Other Sales Workers, Nec.	52,590	60,800	10,550	8,210	18,750
CRAFTSMEN, FOREMEN, AND KINDRED	108,320	121,680	12,580	13,360	25,940
Construction Craftsmen	31,380	34,500	3,690	3,620	7,310
Carpenters	9,410	10,270	1,350	850	2,220
Brickmasons, Stone, Tile Strrs.	2,350	2,570	220	220	440
Cement & Concrete Finishers	770	850	80	90	170
Electricians	4,680	5,460	490	770	1,260
Excavating, Grading Mach. Oprs.	3,950	4,400	320	550	870
Painters & Paperhangers	4,600	5,080	760	480	1,240
Plasterers	420	430	40	10	50
Plumbers & Pipefitters	3,820	4,350	440	530	970
Roofers & Slaters	710	750	90	50	140
Structural Metalworkers	770	830	100	60	150
Foreman, Nec.	13,510	14,900	1,710	1,390	3,103
Metalworking Craftsmen Exc. Mech.	8,350	9,710	1,070	840	1,910
Machinists & Related Occup.	4,170	4,490	520	320	840
Blacksmiths, Forgers, Hammermen	300	290	60	-10	50
Boilermakers	230	250	30	20	50
Heat Treaters, Annealers., Temprs.	140	160	10	10	20
Millwrights	530	590	60	60	120
Molders, Metal (Exc. Coremkrs.)	260	280	20	20	40
Patternmakers, Metal & Wood	290	370	40	80	120
Rollers & Roll Hands	290	320	40	20	60

OCCUPATION	1970 EMPLOYMENT	1975 EMPLOYMENT 1/	1970-1975 JOB OPENINGS DUE TO:		1970-1975 TOTAL JOBS DUE TO REPLACEMENT & EMPLOY. CHANGE
			Replacement Needs	Change in Employ. Level	
Metalworking Craftsmen Exc. Mech. (cont.)					
Sheet Metal Workers	1,440	1,590	140	150	290
Toolmakers, Die-makers, Setters	1,220	1,390	150	170	320
Mechanics & Repairmen	34,760	40,640	3,630	5,690	9,520
Airplane Mech. & Repairmen	2,160	2,630	140	470	500
Motor Vehicle Mechanics	12,010	14,310	1,030	2,290	3,320
Office Machine Mechanics	770	1,000	50	230	280
Radio & TV Mechanics	2,080	2,680	130	600	730
Railroad & Car Shop Mech.	370	430	70	60	130
Other Mechanics & Repairmen	17,350	19,620	2,220	2,260	4,480
Printing Trades Craftsmen	2,490	2,720	310	230	540
Compositors & Typesetters	1,430	1,450	180	50	230
Electrotypers & Stereotypers.	40	40	0	0	0
Engravers Exc. Phot engravers	110	130	20	20	40
Photoengravers & Lithographers.	270	350	30	80	110
Pressmen & Plate Printers	670	750	70	90	160
Transp. & Pub. Util. Craftsmen	5,370	6,010	450	630	1,080
Line & Servn., Tel. & Power	4,650	5,190	300	530	830
Locomotive Engineers	520	610	150	30	240
Locomotive Firemen	200	210	20	20	40
Other Craftsmen & Kindred	11,960	12,720	1,520	750	2,270
Bakers	1,180	1,260	150	90	240
Cabinetmakers	580	610	100	30	130
Craftsmen, Derrickmen, Hoistmen	1,420	1,620	160	210	370
Glaziers	240	290	20	50	70
Jewellers & Watchmakers	460	500	80	40	120
Loom Fixers	10	10	0	0	0
Optics., Lens Grinders, Polshrs.	200	220	30	20	50
Inspectors, Log & Lumber	130	160	30	30	60
Inspectors, Other	1,050	990	160	-60	100
Upholsterers	680	760	80	80	160
Craftsmen & Kindred Wks. Nec.	6,020	6,300	740	270	1,010
OPERATIVES & KINDRED WKS.	115,290	127,290	12,860	11,990	24,850
Drivers & Deliverymen	27,570	31,020	2,220	3,450	5,670
Drivers, Bus, Truck, Tractor	20,700	23,180	1,580	3,470	4,050
Deliverymen, Routemen, Cab Drivers	6,870	7,840	650	970	1,630

OCCUPATION	1970 EMPLOYMENT	1975 EMPLOYMENT 1/	1970-1975 JOB OPENINGS DUE TO:		1970-1975 TOTAL JOBS DUE TO REPLACEMENT & EMPLOY. CHANGE
			Replacement Needs	Change in Employ. Level	
Semiskilled Metalworking Occup. Assemblrs., Metalworking Class A	12,320	14,010	1,320	1,680	3,000
Assemblrs., Metalworking Class B	810	950	110	140	250
Inspectors, Metalworking Class B	2,580	3,450	390	470	860
Machine Tool Opers., Class B	1,230	1,350	150	130	290
Electroplaters	1,860	1,930	230	20	310
Furnacemen, Smelters, Pourers	130	130	10	0	10
Heaters, Metal	190	200	20	10	30
Welders & Flame Cutters	450	490	50	40	90
Transp. & Pub. Util. Operatives	60	70	10	10	20
Brakemen, Switchmen Railroad	4,610	5,420	350	810	1,170
Power Station Operators	1,230	1,420	140	190	330
Sailors & Deckhands	960	1,130	110	160	270
Semiskilled Textile Occup.	200	220	20	20	40
Knitters, Loopers, & Toppers	70	70	10	10	10
Spinners, Textile	2,030	2,290	540	260	800
Weavers, Textile	20	20	0	0	0
Sewers & Stitchers Mfg.	20	20	0	0	0
Other Operatives & Kindred	40	40	10	0	10
Asbestos, Insulation Workers	1,960	2,200	520	250	770
Auto Attendants, Gas & Pkg.	72,140	78,560	8,620	6,420	15,040
Blasters & Powdermen	230	260	30	30	60
Lndr. & Dry Cleaning Opers.	80	100	40	90	1,430
Mine Operatives, Laborers Nec.	4,240	4,480	10	20	30
Meat Cutters, Exc. Meat Packing	4,290	4,290	1,020	250	1,270
Operatives & Kindred Nec.	2,240	2,580	310	-10	300
SERVICE WORKERS	54,830	59,630	290	340	630
Private Household Workers	126,330	151,750	6,520	4,800	11,320
Protective Service Workers	14,480	16,960	32,990	25,430	58,420
Firemen	17,040	20,680	5,280	2,480	7,760
Police, Detectives, Etc.	3,690	4,740	2,850	3,640	6,500
Guards, Watchmen, Doorkeepers	8,440	10,560	840	1,050	1,890
Food Service Workers	4,910	5,390	860	2,120	2,980
Bartenders	31,110	36,560	1,170	470	1,640
Cooks, Exc. Private Households	2,320	2,780	7,650	5,460	13,130
Counter & Fountain Workers	10,130	11,870	430	460	890
	3,800	4,630	2,380	1,740	4,120
			990	830	1,820

OCCUPATION	1970 EMPLOYMENT	1975 EMPLOYMENT 1/	1970-1975 JOB OPENINGS DUE TO:		1970-1975 TOTAL JOBS DUE TO REPLACEMENT & EMPLOY. CHANGE
			Replacement Needs	Change in Employ. Level	
Food Service Workers (cont.)					
Waiters & Waitresses	14,860	17,300	3,860	2,440	6,300
Other Service Workers	63,700	77,530	17,190	13,830	31,020
Airline Stewards, Stewardesses	750	1,010	200	250	200
Attendants, Hosp. & Other Inst.	11,840	16,430	3,480	4,590	8,070
Charwomen & Cleaners	3,120	3,900	840	780	1,620
Janitors & Sextons	9,390	10,900	2,550	1,520	4,030
Nurses, Practical	4,530	6,250	1,780	1,720	3,500
Service Workers Nec.	34,070	39,030	8,330	4,960	13,290
LABORERS, EXC. FARM & MINE	40,550	42,270	4,220	1,720	5,940
FARMERS & FARM WORKERS	46,530	23,160	5,110	-3,430	1,350
TOTAL ALL OCCUPATIONS	870,350	992,900	157,660	122,460	260,140

1/ 1975 Annual average estimates based on projection of total employment by matrix industry.

2/ Detail may not add to totals due to rounding.

Prepared by the State of Colorado, Division of Employment, Research and Analysis Section, June 1972.

APPENDIX G



No. 3 of 3
(31 Areas)

Occupational Earnings and Wage Trends in Metropolitan Areas, 1971-72

U.S. DEPARTMENT OF LABOR/Bureau of Labor Statistics

The Bureau of Labor Statistics is currently surveying ninety-three areas under its program of annual occupational wage surveys in metropolitan areas. The tables in this release present earnings and trend data for thirty-one areas surveyed in the current period (July 1971 through June 1972). Data for sixty-two areas have been presented in two earlier releases.

Wage trends are computed for selected groups of occupations. Earnings information is presented for selected office, professional and technical, and plant (maintenance, powerplant, custodial, and material movement) occupations common to a variety of industries. Classification of workers by occupation is based on a uniform set of job descriptions designed to take account of interestablishment variation in duties within the same job. The job descriptions are presented in the appendix to the individual area bulletin issued on the completion of each survey.

The individual area bulletins show, whenever possible, separate data for the major industry divisions included in the surveys: manufacturing, public utilities, wholesale trade, retail trade, finance, and services. All bulletins present average straight-time earnings and distribution of workers by earnings in selected occupations. Data for some occupations are not shown because either (1) employment in the occupation is too small to provide enough data to merit presentation, or (2) there is possibility of disclosure of individual establishment data. Each bulletin also presents earnings indexes (1967=100) and further detail regarding percents of change measured by earlier surveys in the area. Information on minimum entrance salaries for inexperienced women office workers; shift differentials; scheduled weekly hours; paid holidays; paid vacations; and health, insurance, and pension plans are presented where data are collected. Among most of the major areas surveyed, this information is obtained biennially. It will be collected in fifty-two areas in the current period.

The individual area bulletins now available for the current period are indicated on the order form (the last page of this release) and may be purchased at the price quoted.

Note: In pursuit of brevity, only data for selected areas are reproduced in this appendix. A table on the increase in average earnings has been deleted.

February 1973

In Milwaukee, Wisconsin, we have 17,000 families receiving Aid to Families with Dependent Children. It is estimated that at least 1/2 of these will be required to register for work under the Talmadge Amendments. Statewide we have 37,000 AFDC families of whom about 19,000 will be required to register for jobs under the Talmadge Amendments.

In the Milwaukee SMSA we also presently have 29,500 people unemployed. Statewide we have 93,400 unemployed. The unemployment figures alone confront the WIN program with an almost unsurmountable obstacle. How can we place 8,000 welfare claimants in jobs in Milwaukee County when we already have almost 30,000 people unemployed there? How can we place 19,000 welfare claimants in jobs statewide when we already have more than 93,000 unemployed?

But the Census Employment Survey shows that the problem is far more difficult than we ever could have realized. How can we place any significant number of welfare claimants in jobs in the inner-city of Milwaukee where the unemployment rate is really almost 12 percent and where almost 1/4 of the people are either unemployed or earning below the poverty level? If we are to place welfare recipients in jobs during a time of such extreme job shortage, is it not almost inevitable that the welfare recipients will either have to accept very low-paying, poverty level jobs (as so many "regular workers" must), or simply displace another worker who might have gotten that job?

We are here today to talk about the need for new data for making manpower decisions. The point I am emphasizing is that we have absolutely priceless data already available that has not been brought effectively to the attention of the Congress and the nation and which, if fully understood, would not only lead to almost revolutionary changes in the unsuccessful and inadequate manpower programs we are presently operating, but would itself generate a demand for much better labor market information. In order to get the data we need, we must make the nation aware of the problem we face.

Table 1. Average earnings¹ for selected office occupations studied in 6 broad industry divisions² in 31 areas, March-June 1972

Sex, occupation, and grade	Allentown-Bethlehem-Easton, Pa.-N.J.	Atlanta, Ga.	Beaumont-Port Arthur-Orange, Tex.	Birmingham, Ala.	Canton, Ohio	Chicago, Ill.	Des Moines, Iowa	Durham, N.C.	Fort Lauderdale-Hollywood and West Palm Beach, Fla.
	May 1972	May 1972	May 1972	Mar. 1972	May 1972	June 1972	May 1972	Apr. 1972	Apr. 1972
Men									
Clerks, accounting, class A	\$207.00	\$161.00	\$216.00	\$171.50	\$172.00	\$167.50	\$140.50	\$167.50	-
Clerks, accounting, class B	149.00	135.00	167.50	121.00	-	149.00	116.50	-	-
Clerks, order	-	142.00	-	136.00	-	163.50	-	-	-
Clerks, payroll	186.50	-	187.50	-	-	162.50	-	-	-
Messengers (office boys)	96.00	101.50	112.00	89.00	-	104.00	85.50	-	\$94.50
Tabulating-machine operators, class A	-	-	-	-	-	182.00	-	-	-
Tabulating-machine operators, class B	-	134.50	-	-	-	147.00	-	-	-
Tabulating-machine operators, class C	-	-	-	-	-	-	-	-	-
Women									
Billers, machine (billing machine)	96.00	-	-	93.00	99.00	132.50	89.50	-	98.00
Billers, machine (bookkeeping machine)	112.00	102.00	-	-	-	118.50	-	-	101.50
Bookkeeping-machine operators, class A	-	118.00	-	114.50	-	136.50	127.00	-	124.50
Bookkeeping-machine operators, class B	105.50	111.00	-	98.00	98.50	127.00	-	-	108.00
Clerks, accounting, class A	125.50	136.00	167.50	134.50	119.50	142.50	120.00	112.50	121.50
Clerks, accounting, class B	113.00	112.50	111.00	102.00	105.00	117.00	102.00	100.50	112.00
Clerks, file, class A	-	110.50	-	102.50	-	115.50	105.00	-	-
Clerks, file, class B	107.50	95.50	-	80.00	96.50	108.00	77.50	-	89.00
Clerks, file, class C	105.00	89.00	-	75.50	-	96.00	73.00	-	84.50
Clerks, order	138.00	114.50	-	103.50	-	116.50	99.50	-	-
Clerks, payroll	118.50	120.50	149.00	109.00	126.50	135.50	126.50	119.00	116.00
Comptometer operators	-	113.00	-	94.00	124.50	125.50	97.50	-	-
Keypunch operators, class A	136.00	136.50	136.00	111.50	123.00	132.00	112.00	117.00	121.50
Keypunch operators, class B	116.50	111.00	114.50	93.00	106.50	118.50	97.00	89.00	101.00
Messengers (office girls)	126.50	97.50	-	90.00	-	100.00	79.00	-	94.50
Secretaries ³	143.00	141.50	159.00	131.00	130.50	150.00	124.00	131.00	130.00
Secretaries, class A	167.50	167.50	-	151.50	164.00	181.50	159.50	162.00	158.50
Secretaries, class B	152.00	156.50	150.00	143.50	143.50	162.00	133.00	149.00	145.50

(Continued)

¹Earnings relate to regular straight-time salaries that are paid for standard workweeks.

²Manufacturing, transportation, communication, and other public utilities; wholesale trade; retail trade; finance, insurance, and real estate; and services.

³May include workers other than those presented separately.

NOTE: Dashes indicate no data reported or data that do not meet publication criteria.

Table 1 (Continued)

Sex, occupation, and grade	Allentown- Bethlehem- Easton, Pa.-N.J.	Atlanta, Ga.	Beaumont- Port Arthur- Orange, Tex.	Birmingham, Ala.	Canton, Ohio	Chicago, Ill.	Des Moines, Iowa	Durham, N.C.	Fort Lauderdale Hollywood and West Palm Beach, Fla.
	May 1972	May 1972	May 1972	Mar. 1972	May 1972	June 1972	May 1972	Apr. 1972	Apr. 1972
<u>Women</u>									
Secretaries, class C	139.00	145.00	168.00	129.00	136.00	149.50	121.00	129.00	132.50
Secretaries, class D	126.00	129.50	157.50	114.00	116.00	135.50	112.50	111.50	112.50
Stenographers, general	122.00	121.50	136.50	107.00	108.00	130.00	98.00	112.50	123.50
Stenographers, senior	132.00	141.00	157.00	129.00	120.00	140.50	131.00	125.50	125.50
Switchboard operators, class A	131.00	136.00	-	114.00	-	131.00	115.50	-	94.00
Switchboard operators, class B	99.50	99.00	119.50	84.50	105.50	111.00	85.50	84.50	89.50
Switchboard operator-receptionists	104.00	113.50	106.00	97.50	106.00	120.50	102.50	98.00	90.50
Tabulating-machine operators, class A	-	-	-	-	-	-	-	-	-
Tabulating-machine operators, class B	-	-	-	-	-	145.00	-	-	-
Tabulating-machine operators, class C	-	-	-	-	-	121.50	-	-	-
Transcribing-machine operators, general	-	114.50	-	99.50	-	119.00	100.50	-	-
Typists, class A	134.00	118.50	138.50	103.00	120.00	122.50	97.00	-	105.00
Typists, class B	115.00	99.00	104.00	88.50	97.00	105.00	85.50	93.50	108.50

Table 2. Average earnings¹ for selected professional and technical occupations in 6 broad industry divisions² in 31 areas, March-June 1972

Sex, occupation, and grade	Allentown- Bethlehem- Easton, Pa.-N.J.	Atlanta, Ga.	Beaumont- Port Arthur Orange, Tex.	Birmingham, Ala.	Canton, Ohio	Chicago, Ill.	Des Moines, Iowa	Durham, N.C.	Fort Lauderdale- Hollywood and West Palm Beach, Fla.
	May 1972	May 1972	May 1972	Mar. 1972	May 1972	June 1972	May 1972	Apr. 1972	Apr. 1972
<u>Men</u>									
Computer operators:									
Class A	\$205.00	\$173.00			\$166.00	\$185.50	\$162.50	-	\$136.00
Class B	154.50	157.00	\$164.00	\$129.00	130.50	164.00	142.00	-	-
Class C	-	134.50	-	-	-	137.50	111.00	-	-
Computer programmers, business:									
Class A	-	234.00	-	218.00	236.00	245.50	216.00	-	-
Class B	205.50	207.00	-	180.50	187.50	210.50	178.50	-	197.00
Class C	-	178.50	-	-	172.50	176.00	145.50	-	-
Computer systems analysts, business:									
Class A	-	282.00	-	-	270.50	289.00	263.50	-	-
Class B	-	254.50	-	-	214.00	247.50	226.00	-	-
Class C	-	-	-	-	-	196.50	-	-	-
Draftsmen:									
Class A	217.50	196.00	213.00	210.00	195.00	216.00	-	-	199.50
Class B	183.50	155.00	207.00	167.00	174.50	177.50	171.00	-	165.00
Class C	153.00	135.00	147.50	132.00	145.00	149.00	137.00	-	-
Draftsmen-tracers	144.50	116.00	-	-	125.00	129.50	188.50	-	-
Electronic technicians	-	-	-	-	-	208.50	-	-	170.50
<u>Women</u>									
Computer operators:									
Class A	-	-	-	-	-	176.00	-	-	-
Class B	-	135.50	-	111.00	-	151.50	127.00	-	-
Class C	-	-	-	-	-	133.50	-	-	-
Computer programmers, business:									
Class A	-	-	-	-	-	228.00	-	-	-
Class B	-	196.00	-	-	-	197.00	159.00	-	-
Class C	-	-	-	-	-	166.00	-	-	-

¹Earnings relate to regular straight-time salaries that are paid for standard workweeks.

²Manufacturing; transportation, communication, and other public utilities; wholesale trade; retail trade; finance, insurance, and real estate; and services.

NOTE: Dashes indicate no data reported that do not meet publication criteria.

Table 2 (Continued)

Sex, occupation, and grade	Allentown- Bethlehem- Easton, Pa.-N.J.	Atlanta, Ga.	Beaumont- Port Arthur- Orange, Tex.	Birmingham, Ala.	Canton, Ohio	Chicago, Ill.	Des Moines, Iowa	Durham, N.C.	Fort Lauderdale- Hollywood and West Palm Beach, Fla.
	May 1972	May 1972	May 1972	Mar. 1972	May 1972	June 1972	May 1972	Apr. 1972	Apr. 1972
<u>Women</u>									
Computer systems analysts, business:									
Class A	-	-	-	-	-	279.50	-	-	-
Class B	-	-	-	-	-	233.00	-	-	-
Class C	-	-	-	-	-	193.50	-	-	-
Nurses, industrial (registered)	174.50	178.50	187.50	155.00	162.00	172.50	162.00	-	-

Table 3. Average earnings¹ for selected maintenance, powerplant, custodial, and material movement occupations in 6 broad industry divisions² in 31 areas, March-June 1972

Occupation ³	Allentown-Bethlehem-Easton, Pa.-N.J.	Atlanta, Ga.	Bedmont-Port Arthur-Orange, Tex.	Birmingham, Ala.	Canton, Ohio	Chicago, Ill.	Des Moines, Iowa	Durham, N.C.	Fort Lauderdale-Hollywood and West Palm Beach, Fla.
	May 1972	May 1972	May 1972	Mar. 1972	May 1972	June 1972	May 1972	Apr. 1972	Apr. 1972
<u>Maintenance and powerplant</u>									
Carpenters	\$4.46	\$5.01	\$5.20	\$4.55	\$4.63	\$5.53	\$5.49	\$4.24	\$3.63
Electricians	4.62	5.15	5.13	4.90	4.80	5.42	5.01	4.85	4.20
Engineers, stationary	4.91	4.73	5.24	4.48	4.97	5.91	4.36	-	3.87
Firemen, stationary boiler	3.89	3.14	4.89	-	4.30	4.76	3.65	-	-
Helpers, trades	-	3.29	4.10	3.89	4.30	3.89	-	-	3.33
Machine-tool operators, toolroom	4.71	-	4.33	3.96	5.26	5.18	-	-	4.04
Machinists	4.78	4.70	5.21	4.73	4.82	5.31	4.96	-	-
Mechanics, automotive	4.44	4.66	4.60	4.26	4.47	5.56	5.01	4.65	4.19
Mechanics	4.80	4.19	4.95	4.7	4.58	4.87	4.63	-	4.02
Millwrights	5.01	-	-	-	4.78	5.06	-	-	-
Oilers	-	-	-	-	-	-	-	-	-
Painters	4.24	4.78	5.23	4.19	4.68	5.94	-	-	3.28
Pipefitters	4.61	5.27	5.24	-	4.94	5.22	5.12	-	-
Plumbers	-	-	-	-	-	-	-	-	-
Sheet-metal workers	-	-	-	-	-	5.15	-	-	-
Tool and die makers	5.18	5.25	-	4.27	5.02	5.68	5.69	-	4.49
<u>Custodial and material movement</u>									
Guards and watchmen	3.20	2.15	3.57	2.28	3.59	2.74	-	3.09	2.02
Janitors, porters, and cleaners	3.06	2.20	2.80	2.09	3.21	3.10	2.71	2.27	2.07
Janitors, porters, and cleaners (women)	2.47	1.82	-	1.74	2.40	2.71	2.11	2.09	2.14
Laborers, material handling	3.78	2.91	3.42	2.63	3.82	4.07	3.77	2.75	2.54

(Continued)

¹Earnings relate to hourly earnings excluding premium pay for overtime and work on weekends, holidays, and late shifts.

²Manufacturing; transportation, communication, and other public utilities; finance, insurance, and real estate; and services.

³Data limited to men workers except where otherwise indicated.

⁴Includes all drivers regardless of size and type of truck operated.

NOTE: Dashes indicate no data reported or data that do not meet publication criteria.

Table 3 (Continued)

Occupation ³	Allentown- Bethlehem- Easton, Pa.-N.J.	Atlanta, Ga.	Beaumont- Port Arthur- Orange Tex.	Birmingham, Ala.	Canton, Ohio	Chicago, Ill.	Des Moines, Iowa	Durham, N.C.	Fort Lauderdale- Hollywood and West Palm Beach, Fla.
	May 1972	May 1972	May 1972	Mar. 1972	May 1972	June 1972	May 1972	Apr. 1972	Apr. 1972
<u>Custodial and material movement</u>									
Order fillers	3.03	3.33	-	2.37	3.96	3.85	3.87	-	2.37
Packers, shipping	3.16	2.96	-	3.31	3.75	3.58	3.91	-	2.51
Packers, shipping (women)	-	2.67	-	-	-	3.16	-	-	2.39
Receiving clerks	3.62	3.49	3.33	3.14	3.78	4.11	3.79	-	2.71
Shipping clerks	3.99	3.84	3.94	3.95	3.81	4.00	3.84	-	-
Shipping and receiving clerks	3.40	-	-	3.88	3.57	3.99	3.72	-	-
Truck drivers ⁴	4.65	3.98	3.83	3.18	4.39	5.34	4.52	4.21	3.27
Truck drivers, light (under 1½ tons)	3.21	2.74	3.42	2.46	3.03	5.14	3.28	-	2.80
Truck drivers, medium (1½ to and including 4 tons)	4.17	4.14	3.96	3.10	4.48	5.23	4.33	2.78	-
Truck drivers, heavy (over 4 tons, trailer type)	5.14	4.74	3.10	3.52	4.82	5.49	4.78	-	3.58
Truck drivers, heavy (over 4 tons, other than trailer type)	3.95	-	4.08	-	-	5.27	4.74	-	4.27
Truckers, power (forklift)	3.62	3.53	-	2.98	3.68	3.98	4.09	3.16	3.23
Truckers, power (other than forklift)	3.99	-	-	3.89	3.98	4.20	-	-	-

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